Installation and Operation Manual
X-VA-MT3809-3819-eng
Part Number: 541B049AHG
September, 2008

Brooks® Model MT 3809 and 3819 Metal Tube Variable Area Flowmeters

with Optional Electronics Based on Smart Meter Manager™ Technology

Model MT 3809

BROOKS® INSTRUMENT

Essential Instructions

Read this page before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using and maintaining Brooks Products.

- Read all instructions prior to installing, operating and servicing the product. If this instruction manual is not the correct manual, please see back cover for local sales office contact information. Save this instruction manual for future reference.
- If you do not understand any of the instructions, contact your Brooks Instrument representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Brooks Instrument. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

Pressure Equipment Directive (PED)

All pressure equipment with an internal pressure greater than 0.5 bar (g) and a size larger than 25mm or 1" (inch) falls under the Pressure Equipment Directive (PED). The Directive is applicable within the European Economic Area (EU plus Norway, Iceland and Liechtenstein). Pressure equipment can be traded freely within this area once the PED has been complied with.

- Section 1 of this manual contains important safety and operating instructions related to the PED directive.
- Meters described in this manual are in compliance with EN directive 97/23/EC module H *Conformity Assessment.*
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Meters larger than 25mm or 1" (inch) are in compliance with category I, II, III of PED.
- Meters of 25mm or 1" (inch) or smaller are Sound Engineering Practice (SEP).

ESD (Electrostatic Discharge)

⚠ CAUTION

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of circuit boards or devices.

Handling Procedure:

1. Power to unit must be removed.
2. Personnel must be grounded, via a wrist strap or other safe, suitable means before any printed circuit card or other internal device is installed, removed or adjusted.
3. Printed circuit cards must be transported in a conductive container. Boards must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in protective container for transport, storage or return to factory.

Comments

This instrument is not unique in its content of ESD (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, SMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

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Models MT 3809 & 3819

Dear Customer,

We appreciate this opportunity to service your flow measurement and control requirements with a Brooks Instrument device. Every day, flow customers all over the world turn to Brooks Instrument for solutions to their gas and liquid low-flow applications. Brooks provides an array of flow measurement and control products for various industries from biopharmaceuticals, oil and gas, fuel cell research and chemicals, to medical devices, analytical instrumentation, semiconductor manufacturing, and more.

The Brooks product you have just received is of the highest quality available, offering superior performance, reliability and value to the user. It is designed with the ever changing process conditions, accuracy requirements and hostile process environments in mind to provide you with a lifetime of dependable service.

We recommend that you read this manual in its entirety. Should you require any additional information concerning Brooks products and services, please contact your local Brooks Sales and Service Office listed on the back cover of this manual or visit www.BrooksInstrument.com

Yours sincerely,
Brooks Instrument

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1-1 Description

The Brooks® Models MT 3809 and MT 3819 Variable Area Flowmeters are rugged, all metal flowmeters offering 2% full scale accuracy. The Model MT 3809 is constructed with stainless steel components for measuring a variety of gas, liquid and steam applications while the Model MT 3819 utilizes a ETFE (Tefzel™) lining for aggressive liquid and gas applications. Flow rate indication is provided by means of magnetic coupling where a magnet, encapsulated in the float, is coupled to a rotatable magnet located in the rear of the indicator, thus turning the dial indicator mounted on the meter.

Optional accessories available include 4-20 mA output with HART microprocessor transmitter with or without configurable alarms and pulse output for totalization. The microprocessor electronics are based on the proprietary Smart Meter Manager technology utilized as the basis for an array of Brooks products.

Also available are front adjustable inductive alarms, high temperature or stainless steel indicator housings, valves, sight flows, flow controllers and material certifications.

1-2 Design Features

- Broad range of flow capacities
- 2% Full scale accuracy
- Versatile construction for all gas, liquid, steam applications
- Operable under high temperatures and pressures
- Flanged or female NPT connections
- Optional 4-20mA and HART® programmable microprocessor transmitter with or without alarms and pulse output for totalization
- Electronics designed with either intrinsically safe or explosion proof construction to meet UL, (US & Canada) ATEX certifications and CE requirements

1-3 Specifications - Meter

⚠ WARNING

Do not operate this instrument in excess of the specifications listed below. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

Capacities, Pressure Drop and Viscosity Immunity Ceiling

Refer to Tables 1-1A and 1-1B

Accuracy

Standard Flow Accuracy: ± 2% Full Scale

Optional Flow Accuracy: ± 1% Full Scale

Repeatability
0.25% Full Scale

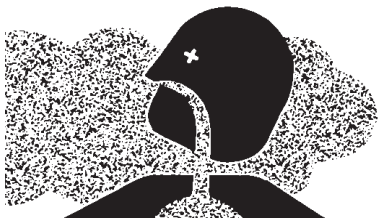
Pressure Ratings
Refer to Table 1-2 for Model MT 3809 maximum non-shock pressure.
Model MT 3819 pressure rating is dependant on flange rating.

Pressure Equipment Directive (PED) 97/23/EC
Flow meter complies under Sound Engineering
Practices (SEP) or Catagories I, II or III

Scales
Standard: Detachable aluminum plate (Single or dual scales)
Graduations: Choice of direct reading units, percentage of maximum flow

Operating Fluid Temperature Limits (Meter only)
Minimum MT 3809 and MT 3819: -20°F (-29°C)
Maximum:
Standard MT 3809: 420°F(215°C)
Standard MT 3809 with Valve: 392°F(200°C)
Standard MT 3819: 302°F (150°C)
Refer to Table 1-3 for temperature limitations for meters with electronics.

Materials of Construction:



⚠ WARNING

METER/CONTROLLER SEAL COMPATIBILITY

Products in this manual may contain metal or elastomeric seals, gaskets, O-rings or valve seats. It is the "user's" responsibility to select materials that are compatible with their process and process conditions. Using materials that are not compatible with the process or process conditions could result in the Meter or Controller leaking process fluid outside the pressure boundary of the device, resulting in personnel injury or death.

It is recommended that the user check the Meter or Controller on a regular schedule to ensure that it is leak free as both metal and elastomeric seals, gaskets, O-rings and valve seats may change with age, exposure to process fluid, temperature, and /or pressure.

Metering Tube
MT 3809 Standard: 316L stainless steel
MT 3809 Optional: Inconnel 625™, Hastelloy B™, Hastelloy C™, titanium

MT 3819 Standard: 316L stainless steel with ETFE (Tefzel) lining

Flanges and End Fittings
MT 3809 Standard: 316/316L stainless steel dual certified
MT 3809 Optional: Hastelloy B, Hastelloy C, titanium

MT 3819 Standard: 316L stainless steel

Connections
MT 3809 Standard:
150 lbs, 300 lbs or 600 lbs RF ANSI B 16.5 flanges or PN 40 DIN 2527/2635; or JIS flanges 10K or 20K; or Female NPT, Male NPT for No O-ring meter only
125/250 Ra micro inch (3.2/6.3 Ra micro meter) cerated flange finish. Consult factory for optional uncerated flange finish.
Vertical inlet and outlet

MT 3819 Standard:
150 lbs RF ANSI B 16.5 flanges or PN 40 DIN 2527/2635
MT 3819 Optional:
300 lbs RF ANSI B 16.5 flanges or PN 40 DIN 2527/2635. For other ratings/flange types consult factory.
125/250 Ra micro inch (3.2/6.3 Ra micro meter) cerated flange finish. Consult factory for optional uncerated flange finish.
Vertical inlet and outlet

Floats
MT 3809 Standard: 316L stainless steel
MT 3809 Optional: Inconnel 625, Hastelloy C or titanium

MT 3819 Standard: Hastelloy C, Sizes 7 and 8, PVDF Sizes 10, 12 and 13.
MT 3819 Optional: Inconnel 625 or titanium all sizes; all Teflon® internals Sizes 10, 12 and 13.

O-rings (NPT only)
MT 3809 Standard: Viton® fluoroelastomers
MT 3809 Optional: Teflon, none with male NPT connections

MT 3819: None

Indicator Housing and Cover
Enclosure NEMA 4X construction
MT 3809 and MT 3819 Standard Housing: Die cast aluminum, polyurethane paint with glass window
MT 3809 and MT 3819 Optional Housing: 316L stainless steel with gritblast and glass window; epoxy paint for aluminum housing

Meter Dimensions
Refer to Figure 1-1

Table 1-1A Model MT 3809 Capacities, Pressure Drop and Viscosity Immunity Ceiling

METER SIZE	CONNECTION SIZE DIN DN mm	CONNECTION SIZE ANSI inches	FLOAT CODE	FLOAT MATERIAL STAINLESS STEEL 316L WATER l/h	WATER gpm	AIR [1,2] scfm	AIR [1,2] nm3/h	Press Drop mbar	Press Drop inches WC	VIC (cSt) (cSt)	Max. Visc (cSt)	PED Category
7	15	1/2"	A	25	0.11	0.49	0.78	30	13	1	40	SEP
			B*	65	0.28	1.2	2	30	13	1	20	SEP
			C	130	0.59	2.4	3.7	30	13	1	120	SEP
			D*	200	0.88	3.7	5.8	35	15	1	20	SEP
8	15	1/2"	A	250	1.1	5.2	8.2	45	19	2	250	SEP
			B	400	1.7	7.7	12	55	23	1	180	SEP
			C	650	2.8	11	18	60	25	2	475	SEP
			D	1000	4.4	21	33	130	53	1.5	250	SEP
10	25	1"	A	1200	5.2	19	30	60	25	5	475	CAT I, II or III
			B	1500	6.6	31	49	70	29	1.5	400	CAT I, II or III
			C	2400	10	41	65	85	35	7	475	CAT I, II or III
			D	3500	15	65	100	155	63	4	475	CAT I, II or III
12	40	1 1/2"	A	4000	17	67	100	50	21	50	475	CAT I, II or III
			B	6000	26	94	140	60	25	30	475	CAT I, II or III
			C	8000	35	150	230	150	61	2	475	CAT I, II or III
			D	10000	46	210	330	300	121	2	475	CAT I, II or III
13	50	2"	A	6500	28	100	160	50	21	50	475	CAT I, II or III
			B	9500	41	160	250	60	25	50	475	CAT I, II or III
			C	12000	55	200	310	100	41	2.5	475	CAT I, II or III
			D	20000	88	390	620	300	121	1	475	CAT I, II or III
15	80	3"	A	20000	88	390	620	110	45	8	475	CAT I, II or III
			B	30000	130	550	860	140	57	7	475	CAT I, II or III
			C	40000	170	750	1100	280	113	5	475	CAT I, II or III
16	100	4"	A	49000	210	NA	NA	160	65	15	475	CAT I, II or III
			B	70000	300	NA	NA	210	85	10	475	CAT I, II or III
			C	100000	440	NA	NA	300	121	5	475	CAT I, II or III

1. Air flows in scfm are given at 70°F and 14.7 psia
2. Air flows in nm3/h are given at 0°C and 1.013 bar (a)
3. *Minimum operating pressure required 7 psig / 0.48 bar

Table 1-1B Model MT 3819 (Tefzel Lined) Capacities and Pressure Drop

METER SIZE	CONNECTION SIZE DIN DN mm	CONNECTION SIZE ANSI inches	TUBE FLOAT CODE	STANDARD FLOAT MATERIAL CAPACITIES (See Note 3) WATER l/h	WATER gpm	AIR [1,2,4] scfm	AIR [1,2,4] nm3/h	Press Drop mbar	Press Drop inches WC	PED Category
7	15	1/2"	GA	110	0.48	2	3.2	25	11	SEP
			GB	170	0.75	3.2	5	50	21	SEP
8	15	1/2"	A	250	1.1	4.6	7.3	30	13	SEP
			B	420	1.8	7.7	12	45	19	SEP
			C	500	2.2	9.2	14	40	17	SEP
			D	850	3.7	15	24	130	53	SEP
10	25	1"	A	1400	6.2	26	41	45	19	CAT I, II or III
			B	2000	8.8	37	58	106	43	CAT I, II or III
			C	2400	10	44	70	90	37	CAT I, II or III
			D	3000	13	55	87	130	53	CAT I, II or III
12	40	1 1/2"	A	3000	13	55	87	50	21	CAT I, II or III
			B	4000	18	74	110	75	31	CAT I, II or III
			C	5000	22	92	140	85	35	CAT I, II or III
			D	6000	26	110	170	120	49	CAT I, II or III
13	50	2"	A	6000	26	110	170	95	39	CAT I, II or III
			B	8000	35	147	230	125	51	CAT I, II or III
			C	12000	53	220	340	200	81	CAT I, II or III
			D	15000	66	270	430	225	91	CAT I, II or III

1. Air flows in scfm are given at 70°F and 14.7 psia
2. Air flows in nm3/h are given at 0°C and 1.013 bar (a)
3. Sizes 7 & 8 floats are Hastelloy C-276 (Density = 8.94 kg/dm^3), Sizes 10, 12 & 13 are PVDF (Density = 4.22 kg/dm^3)
4. For gas applications operating pressure must be greater than 29 PSIA / 2 bar (a)

*Table 1-2 Model MT 3809 Pressure Ratings**

Flange Rating**	**316/316L Stainless Steel** (psig at indicated temperature)						
	-20°F to 100°F	200°F	300°F	400°F	500°F	600°F	617°F
150 lb.	275	240	215	195	170	140	134
300 lb.	720	620	560	515	480	450	448
600 lb.	1440	1240	1120	1030	955	905	899

Threaded NPT	**316L Stainless Steel** (psig at indicated temperature)						
	-20°F to 100°F	200°F	300°F	400°F	500°F	600°F	617°F
7 & 8	1500	1500	1400	1400	1300	1200	1200
10	1500	1500	1400	1400	1300	1200	1200
12	1500	1500	1400	1400	1300	1200	1200
13	1300	1300	1200	1200	1100	1000	1000

* Model MT 3819 pressure ratings dependent on flange rating.
**Flanges are dual certified 316L/316 stainless steel.

Table 1-3 Maximum Fluid Temperatures at 104°F (40°C) Ambient

3809	**Indicator Only**		**Indicator with Alarm[1]**		**Indicator with Transmitter[1]**	
Size	Standard	High Temperature	Standard	High Temperature	Standard	High Temperature
7 & 8	-58° thru 420° F	617° F	-22° thru 320° F	450° F	-22° thru 195° F	300° F
	-50° thru 215° C	325° C	-30° thru 160° C	230° C	-30° thru 90° C	150° C
10 thru 16	-58° thru 420° F	617° F	-22° thru 320° F	617° F	-22° thru 195° F	400° F
	-50° thru 215° C	325° C	-30° thru 160° C	325° C	-30° thru 90° C	200° C

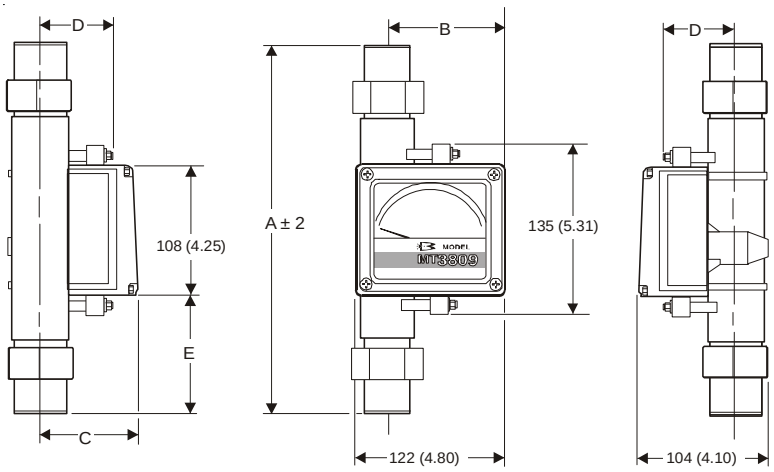
3819	**Indicator Only**		**Indicator with Alarm[1]**		**Indicator with Transmitter[1]**	
Size	Standard	High Temperature	Standard	High Temperature	Standard	High Temperature
7 thru 13	-22° thru 300° F	300° F	-22° thru 300° F	300° F	-22° thru 195° F	300° F
	-30° thru 150° C	150° C	-30° thru 150° C	150° C	-30° thru 90° C	150° C

309 &3819 Minimum and Maximum Ambient Temperature

Indicator Only[2]	**Indicator with Alarm or Transmitter**
-58° thru 150° F	-22° thru 150° F
-50° thru 65° C	-30° thru 65° C

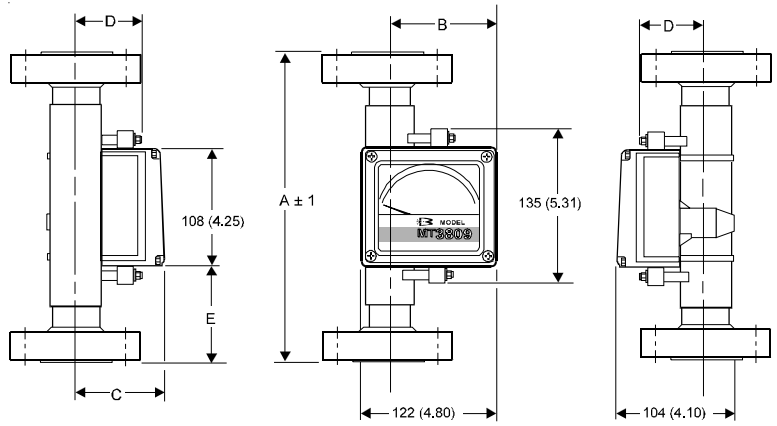
1. High Temperature option not available with Explosion Proof Housing
2. Ambient Temperature below -22° F / -30° C requires Low Ambient Temperature Option

Model MT 3809 with NPT-F Connections mm (inches)*



Meter Size	Connection	A	B	C	D	E	WEIGHT (Approx.)**
7 & 8	1/2" NPT-F	225 (8.85)	88 (3.46)	72 (2.83)	53 (2.09)	59 (2.32)	1.3 kg (3 lbs.)
10	1" NPT-F	300 (11.81)	95 (3.78)	80 (3.15)	59 (2.32)	96 (3.78)	2.8 kg (7 lbs.)
12	1-1/2" NPT-F	300 (11.81)	105 (4.13)	89 (3.50)	65 (2.56)	96 (3.78)	5 kg. (12 lbs.)
13	2" NPT-F	300 (11.81)	111 (4.37)	95 (3.74)	77 (3.63)	96 (3.78)	6.3 kg (14 lbs.)

Models MT 3809 and MT 3819 with Flanged Connections mm (inches)*



Meter Size	Connection	A***	B	C	D	E	WEIGHT (Approx.)**
7 & 8	1/2" Flange	250 (9.84)	88 (3.46)	72 (2.83)	53 (2.09)	71 (2.78)	2.5 kg (6 lbs.)
10	1" Flange	250 (9.84)	96 (3.78)	80 (3.15)	59 (2.32)	71 (2.78)	4.2 kg (10 lbs.)
12	1-1/2" Flange	250 (9.84)	105 (4.13)	89 (3.50)	65 (2.56)	71 (2.78)	6.8 kg (15 lbs.)
13	2" Flange	250 (9.84)	111 (4.37)	95 (3.74)	77 (3.03)	71 (2.78)	8.7 kg (20 lbs.)
MT 3809 Only							
15	3" Range	250 (9.84)	128 (5.04)	112 (4.41)	89 (3.50)	71 (2.78)	15 kg. (33 lbs.)
16	4" Range	350 (13.78)	142 (5.59)	126 (4.96)	102 (4.02)	121 (4.76)	29 kg (64 lbs.)

* Dimensions shown are for standard indicator units as well as units with the Smart Meter Manager transmitter or stand-alone inductive alarms.
Consult factory for dimensions of units with transmitters plus alarms and pulse output or transmitters with inductive alarms.
Consult Factory for no O-ring male NPT meter dimensions.

** Weights shown for aluminum indicator and PN40/50 lb flanges. Add 1.7 kg (3.8 lbs.) for steel indicator housing.

***Model MT 3809 meters with explosion proof transmitters and 300# oversized flanges or 600# regular and oversized flanges have a 300mm lay length.

Figure 1-1 Models MT 3809 and MT 3819 Dimensions

1-4 Optional Accessories

Needle control valves, sight flow indicators and flow controllers (available on the MT 3809 only) For flow rate control, needle control valves or flow controllers may be externally piped into the inlet or outlet side of the instrument. Needle control valves and flow controllers can be supplied up to size 10 (1") maximum 6.6 gpm (1,500 l/hr) water equivalent. Sight flow indicators are available for all flanged meters and up to size 13 (2") NPT meters.

1-5 Optional Electronic Equipment

Electronic equipment available with the Models MT 3809 and MT 3819 include the Microprocessor Transmitter, Microprocessor Transmitter/Alarm/ Pulse Output for totalization, Inductive Alarms, and Transmitter with Inductive Alarms, refer to pages 6 through 12 for additional information. All models are designed to be either Intrinsically Safe (aluminum or stainless steel housing) or Explosion Proof (aluminum housing only). All electronic accessories options are available for high temperature applications. Refer to Table 3 to determine the appropriate model for your application.

1-6 Microprocessor Transmitter With or Without Alarms and Pulse Output Based on Brooks Smart Meter Manager Technology

- A 2-wire, loop-powered device for ease of wiring and installation
- 4-20 mA analog output for flowrate, with Bell-202 modulated HART communication channel
- User selectable 0% and 100% analog output ranges with optional smoothing
- Flexible (mix & match) units of measure for flowrates, totals, temperatures, densities, etc.
- Two flow totalizers: Resettable and inventory totalization
- User configurable, scaleable pulse output for various engineering units
- Comprehensive alarms for both process flow and internal diagnostic checks
- Easily configured and compatible with other plant equipment
- Patented magnetic sensor which is resistant to external magnetic fields

B. Description

"Smart Inside" best defines the Brooks transmitter with optional alarms and pulse output for totalization. The transmitter (with or without the alarms and pulse output) is a compact microprocessor device designed to interface directly with the Models MT 3809 and MT 3819 flowmeters. The microprocessor electronics are based on the Brooks Smart Meter Manager (SMM™) technology common to other Brooks flowmeters.

The transmitter is HART-programmable for numerous variables such as flow rate, totalization, calibration factors, and high-low alarm parameters. It is programmable with easy-to-use hand held configurators such as the Emerson™ HART 275 Communicator. Prior to shipment, commonly used default values are programmed by Brooks to ensure ease of operation and quick startup. However, parameters may be reprogrammed by the user if needed. The 2-wire electronics system is easy to install and interface with other existing equipment such as process management systems or maintenance control packages.

In operation the microprocessor transmitter converts the measured process flow into a 4-20mA output with HART protocol. The signal originates when the float magnet inside the metering tube passes a magnetic sensor mounted on the transmitter. Flow rate information may be viewed locally at the meter scale or displayed remotely (along with other flow data) as a function of external support systems through analog/pulse outputs or multiple digital communications.

In addition to transmitter features, this unit can also be ordered with optional alarms and pulse output provided by open collector switches. One or two alarms may be programmed prior to shipment of the unit or at the customer site with a hand-held communicator.

C. Specifications - SMM Microprocessor Transmitter with or without Alarm and Pulse Output

EMC Directive 89/336/EEC: EN 50081, EN 50082 and EN 61326-1

Hazardous Location Classification
Enclosure: Type 4X/ IP65
Ambient Temperature: -22°F≥ Tamb ≤ 150°F (-30°C ≥ Tamb ≤ 65°C)

Intrinsically Safe
United States and Canada UL Listed, E73889, Vol. 1, Sect. 15
Class I, II and III, Division 1, Groups A, B, C, D, E, F, and G; T4

Europe – KEMA 01ATEX1235 X

II 2 G EEx ia IIC T4
II 2 D T135ºC

Entity Parameters (Transmitter):
Ui=Vmax=30 Vdc; Ii=Imax=140 mA; Ci= 15 nF; Li= 0 mH

Entity Parameters (Integral Alarms):
Ui=Vmax=30 Vdc; Ii=Imax=45 mA; Ci= 0 nF; Li= 0 mH

Non-Incendive
United States and Canada UL Listed, E73889, Vol. 1, Sect. 15
Class I, II, III, Division 2, Groups A, B, C,D F, and G; T4

Europe – KEMA 01ATEX1236

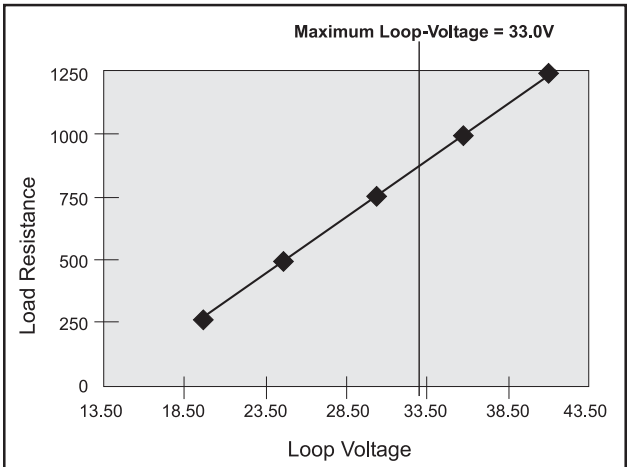
II 3 G EEx nA II T4
II 3 D T135º C

Explosion- proof/ Flame-proof
United States and Canada UL Listed, E73889, Vol. 1, Sect. 14
Class I, Division 1, Groups C, D;
Dust Ignition-proof, Class II, Division 1, Groups E, F, G; Class III; T4

Europe – KEMA 01ATEX2207 X

II 2 G EEx d IIB T4
II 2 D T135º C

Power Supply and Maximum Load Resistance
21.0 to 33.5 Vdc Power Supply, refer to Figure 1-2 below.
Input Power: Derived from Analog Output
(2-wire current loop transmitter)



Note: Load resistance should also include I.S. barrier resistance. When using Model 275 HART Communicator the minimum load resistance is 250 ohms.

Figure 1-2 Power Supply vs. Maximum Load Resistance

Output Signals
Transmitter: 4-20 mA analog output with HART
Update Rate: 4 times per sec.
Range: 3.8 to 22.0 mA

Two Alarm Outputs (open collector)
Optically isolated outputs assignable to alarms, reverse flow indicator, or manual valve.
- Maximum off-state voltage: 30 Vdc
- Maximum off-state current: 0.05 mA
- Maximum on-state voltage: 1.2 Vdc
- Maximum on-state current: 20 mA

One Pulse Output (open collector)
Optically isolated. Scaleable to a variety of engineering unit systems (pulses per liter, gallons, etc.)
- Range: 1 Hz to 1 kHz
- Maximum off-state voltage: 30 Vdc
- Maximum off-state current: 0.05 mA
- Maximum on-state voltage: 1.2 Vdc
- Maximum on-state current: 20 mA

Linearity
Less than 1% at maximum current

Temperature Influence
Less than 0.04% per °C

Voltage Influence
Less than 0.002%/Vdc

Load Resistance Influence
±0.1% full scale

Transmitter, Alarm and Pulse Wiring Diagrams
Refer to Figures 1-3, 1-4, 1-5 and 1-6

For Division 1 explosion proof installations, the optional explosion proof enclosure must be used. This enclosure does not use the auxiliary terminal box, as shown on some of the installation diagrams. All connections are made directly within the housing. Cable entry device shall be certified as Flame-proof type, suitable per the conditions of use and correctly installed. If used with conduit, refer to Figure 1-7, a sealing device shall be provided in accordance with Figure 1-7.

For Division 2 non-incendive installations, either the standard enclosure or the explosion proof enclosure may be used.
For both Division 1 explosion proof and Division 2 non-incendive installations, the barriers shown in the installation drawings are unnecessary. However, NEC Class 2 circuits are required.

The circuits shall be wired separately or using a Multicore Cable Type B, in accordance with EN 60079-14. Also wiring must be done in accordance with the applicable electrical codes, ie., NEC Chapter 5, CEC Section 18 and any local codes.

TRANSMITTER ACCESSORIES
General purpose and intrinsically safe HART compatible power supplies are available in 110V and 220V.

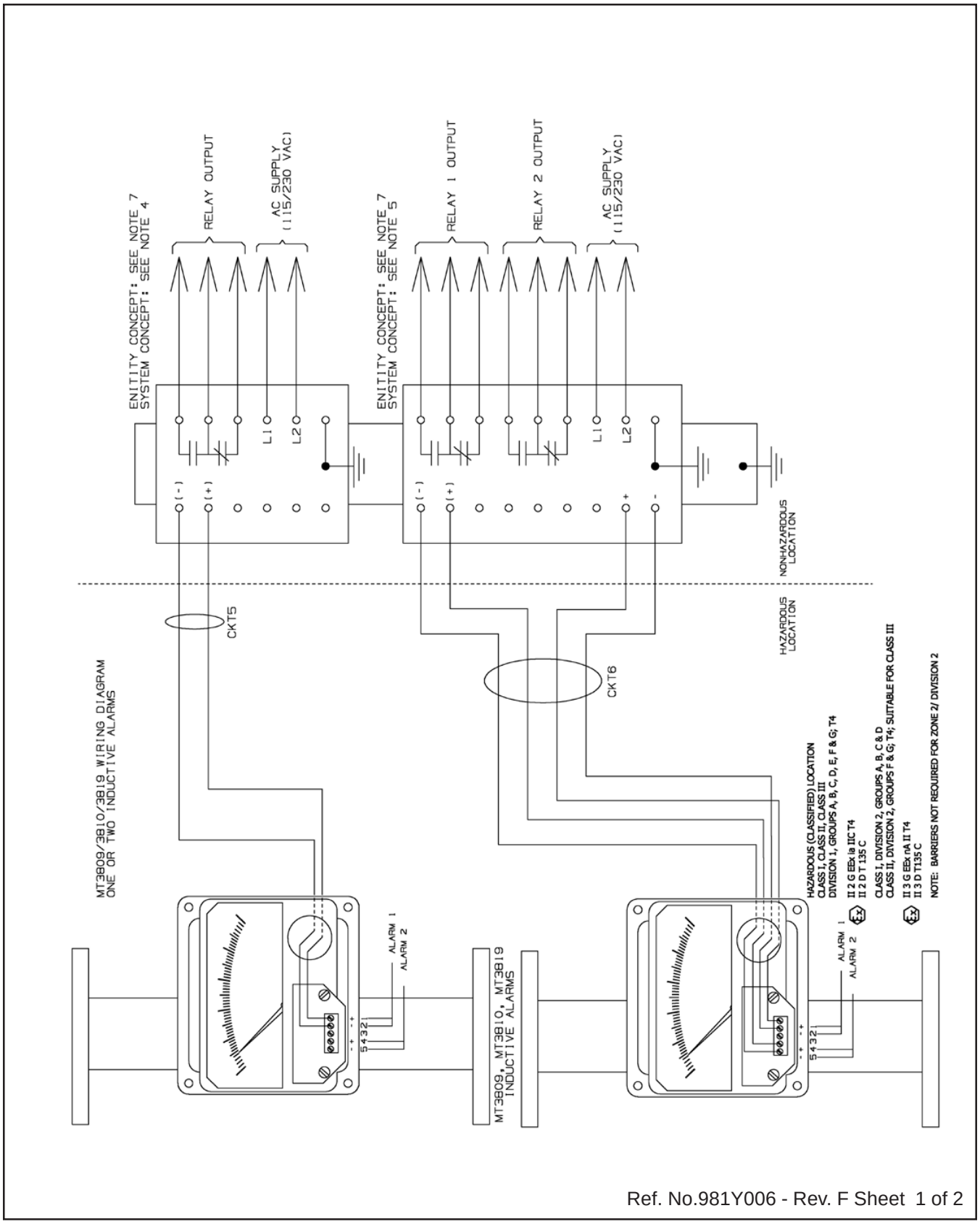

ENTITY CONCEPT: SEE NOTE 7
SYSTEM CONCEPT: SEE NOTE 4
RELAY OUTPUT
AC SUPPLY (115/230 VAC)
ENTITY CONCEPT: SEE NOTE 7
SYSTEM CONCEPT: SEE NOTE 5
RELAY 1 OUTPUT
RELAY 2 OUTPUT
AC SUPPLY (115/230 VAC)
L1
L2
(-)
(+)
NONHAZARDOUS LOCATION
HAZARDOUS LOCATION
CKT5
CKT6
MT3809/3810/3819 WIRING DIAGRAM
ONE OR TWO INDUCTIVE ALARMS
ALARM 1
ALARM 2
5 4 3 2
MT3809, MT3810, MT3819
INDUCTIVE ALARMS
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, CLASS II, CLASS III
DIVISION 1, GROUPS A, B, C, D, E, F & G; T4
II 2 G EEx ia IIC T4
II 2 D T 135 C
CLASS I, DIVISION 2, GROUPS A, B, C & D
CLASS II, DIVISION 2, GROUPS F & G; T4; SUITABLE FOR CLASS III
II 3 G EEx nA II T4
II 3 D T135 C
NOTE: BARRIERS NOT REQUIRED FOR ZONE 2/ DIVISION 2
Ref. No.981Y006 - Rev. F Sheet 1 of 2

Figure 1-3 Transmitter Only Wiring Diagram

NOTES:

1- CKT5 AND CKT6 MUST RUN IN SEPARATE CABLES OR IN ONE CABLE WHICH HAS
SUITABLE INSULATION. REFER TO INSTRUMENT SOCIETY OF AMERICA (ISA) RECOMMENDED PRACTICE RP12.6 FOR
INSTALLING INTRINSICALLY SAFE LOOPS AND THE NATIONAL ELECTRICAL CODE, NFPA 70, ARTICLE 504.
FOR CANADA, INSTALLATIONS MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART I.

THE LENGTH OF THE CABLES WILL BE RESTRICTED TO THE FOLLOWING VALUES:

CIRCUIT	GROUP	C (uF)	L (mH)	CABLE LENGTH	BARRIER NO.
CKT5,6	A,B	1.27uF	8.48mH	21,167 FT MAX	KFD2-SR2-Ex2.W
CKT5,6	C,E	3.82uF	2.99mH	63,667 FT MAX	KFD2-SR2-Ex2.W
CKT5,6	D,F,G	1.02uF	7.44mH	169,667 FT MAX	KFD2-SR2-Ex2.W
CKT5,6	A,B	1.26uF	8.48mH	21,167 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	C,E	3.82uF	2.99mH	63,667 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	D,F,G	1.02uF	7.44mF	169,667 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	A,B	6.00uF	3.40mH	10,000 FT MAX	WE77/EXI-2U
CKT5,6	C,E	2.50uF	1.30mF	41,667 FT MAX	WE77/EXI-2U
CKT5,6	D,F,G	7.50uF	3.00mF	125,000 FT MAX	WE77/EXI-2U

FOR INTRINSIC SAFETY PURPOSES, THE MAXIMUM CABLE LENGTH WAS CALCULATED USING A CAPACITANCE OF 60 pF/FT
AND AN INDUCTANCE OF 1.20UH/FT PER UL913.

2- WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
AVERTISSEMENT: LA SUBSTITTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.

3- THE BARRIERS MUST NOT BE CONNECTED TO ANY DEVICE WHICH USES OR GENERATES IN EXCESS OF 250 VOLTS RMS OR
DC UNLESS IT HAS BEEN DETERMINED THAT THE VOLTAGE HAS BEEN ADEQUATELY ISOLATED FROM THE BARRIERS.

4- SINGLE RELAY BARRIER:
PEPPERL & FUCHS (WE77/EXI)-115 VAC, 45-60 HZ
(WE77/EXI-220)-230 VAC, 45-60 HZ
(KFA5-SR2-EXI.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EXI.W 230 V, 45-65 HZ)

RELAY RATINGS (PEPPERL & FUCHS WE77/EXI)
AC V MAX ≤ 250 VAC
I MAX ≤ 4 AMP
P MAX ≤ 500 VA/Cos 0=0.7
DC 110 VDC/0.2 AMP
60 VDC/0.6 AMP
24 VDC/4.0 AMP

RELAY RATINGS (PEPPERL & FUCHS KFA5/KFA6)
AC V MAX ≤ 250 VAC
I MAX ≤ 2 AMP
P MAX 253V/2A Cos0>=0.7
DC 40V/2A RESISTIVE LOAD

5- DUAL RELAY BARRIER:
PEPPERL & FUCHS (WE77/EX2)-115 VAC, 45-60 HZ
(WE77/EX2-220)-230 VAC, 45-60 HZ
(KFA5-SR2-EX2.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EX2.W 230 V, 45-65 HZ)

DC POWERED BARRIER
MTL 4016 - 20-35 VDC
45-60 mA
REED RELAY CONTACT RATINGS
10 WATTS, 0.5 A, 35 VDC
RESPONSE TIME 2MSEC MAX
NOTE: REACTIVE LOADS MUST BE ADEQUATELY SUPPRESSED.

PEPPERL & FUCHS
KFD2-SR2-EX2.W
POWER SUPPLY 20-30 VDC, 50 MA MAX
Voc=8V, Isc=8 MA
SWITCH POINT/SWITCHING HYSTERESIS 1.2 MA-2.1 MA/≈0.2 MA
INPUT PULSE LENGTH/INPUT PULSE PAUSE≥20 MSEC/≥20 MSEC
OUTPUT: AC 250V/2A/Cos0 >0.7
DC 40V/2A RESISTIVE
RESPONSE TIME≈20 MSEC

6- WHERE APPLICABLE,CKT5,CKT6, MUST BE IN COMPLIANCE WITH
EN50039 CLAUSE 5.3.2: TYPE B CABLE.

7- CERTIFIED ASSOCIATED APPARATUS WITH APPLICABLE DIVISION AND GROUP OR ZONE AND GROUP APPROVAL WITH ENTITY PARAMTERS:

DIVISIONS	ZONES	PARAMETERS
Voc ≤ Vmax	Uo ≤ Ui	Vmax=Ui=16
Isc ≤ Imax	Io ≤ Ii	Imax=Ii=25 mA
Ca ≥ Ci + Ccable	Co ≥ Ci + Ccable	Ci=50nF
La ≥ Li + Lcable	Lo ≥ Li + Lcable	Li=250 uH

The Entity Concept allows interconnection of intrinsically safe and associated
apparatus not specifically examined in combination as a system, when the approved
values of Voc (or Uo) and Isc (or Io) for the associated apparatus are less than
or equal to Vmax (or Ui) and Imax (or Ii) for the intrinsically safe apparatus,
and the values of Ca (Co) and La (Lo) for the associated apparatus are greater
than Ci + Ccable, Li + Lcable.

Ref. No.981Y006 - Rev. F Sheet 2 of 2

Figure 1-4 Transmitter Only Wiring Notes

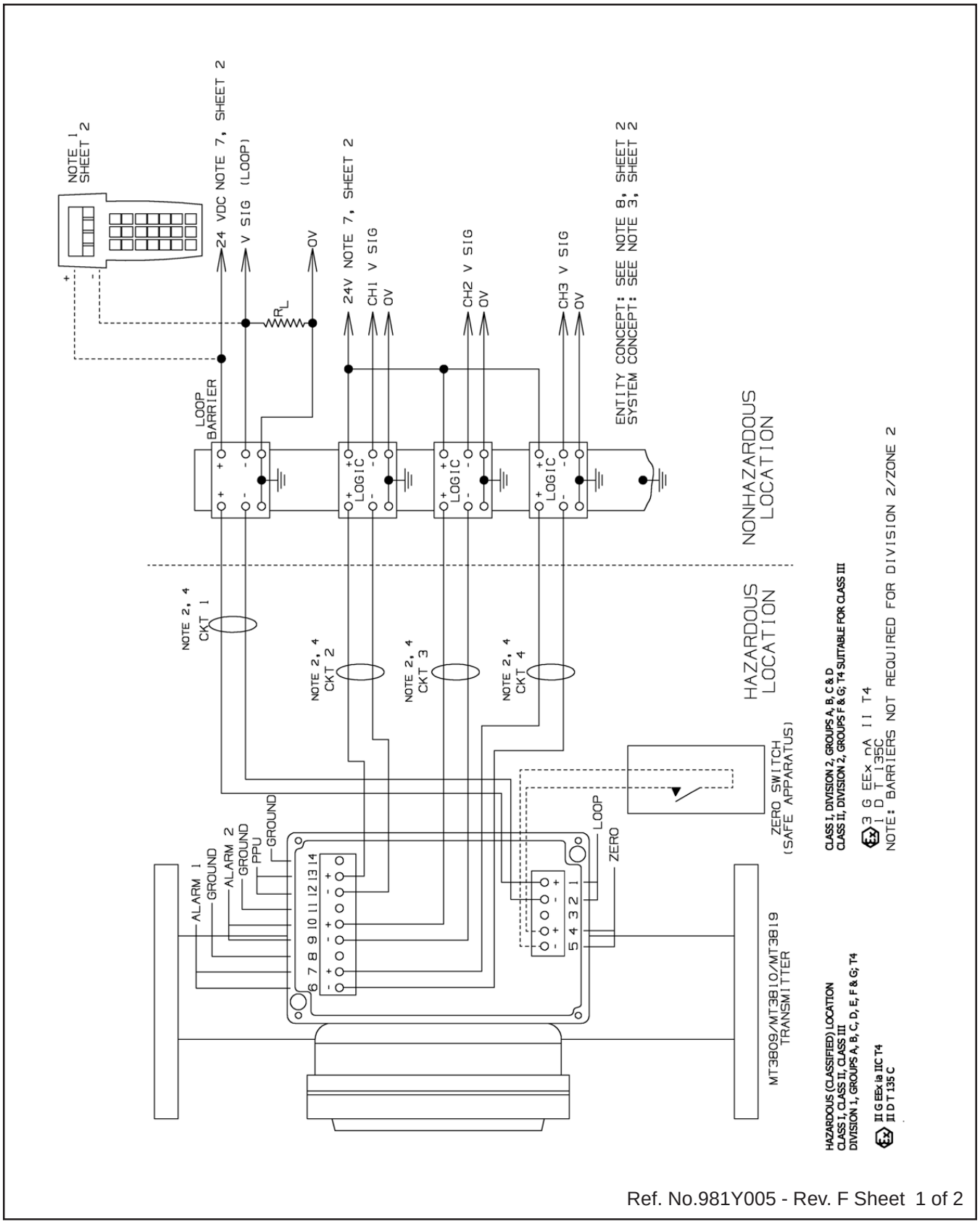

NOTE 1 SHEET 2
24 VDC NOTE 7, SHEET 2
V SIG (LOOP)
0V
24V NOTE 7, SHEET 2
CH1 V SIG
0V
CH2 V SIG
0V
CH3 V SIG
0V
ENTITY CONCEPT: SEE NOTE 8, SHEET 2
SYSTEM CONCEPT: SEE NOTE 3, SHEET 2
RL
LOOP BARRIER
LOGIC
NONHAZARDOUS LOCATION
HAZARDOUS LOCATION
NOTE 2, 4 CKT 1
NOTE 2, 4 CKT 2
NOTE 2, 4 CKT 3
NOTE 2, 4 CKT 4
ZERO SWITCH (SAFE APPARATUS)
ALARM 1
GROUND
ALARM 2
GROUND
PPU
GROUND
LOOP
ZERO
6 7 8 9 10 11 12 13 14
5 4 3 2 1
MT3809/MT3810/MT3819 TRANSMITTER
CLASS I, DIVISION 2, GROUPS A, B, C & D
CLASS II, DIVISION 2, GROUPS F & G; T4 SUITABLE FOR CLASS III
3 G EEx nA II T4
I D T 135C
NOTE: BARRIERS NOT REQUIRED FOR DIVISION 2/ZONE 2
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, CLASS II, CLASS III
DIVISION 1, GROUPS A, B, C, D, E, F & G; T4
II G EEx ia IIC T4
II D T 135 C
Ref. No.981Y005 - Rev. F Sheet 1 of 2

Figure 1-5 Transmitter with Alarm and Pulse Outputs Wiring Diagram

NOTES:
1- THIS DEVICE IS A ROSEMOUNT MODEL 275 HAND HELD COMMUNICATOR.
2- CKT1, CKT2, CKT3, CKT4 MUST RUN IN SEPARATE CABLES OR IN ONE CABLE WHICH HAS SUITABLE INSULATION. REFER TO INSTRUMENT SOCIETY OF AMERICA (ISA) RECOMMENDED PRACTICE RP12.6 FOR INSTALLING INTRINSICALLY SAFE LOOPS AND THE NATIONAL ELECTRICAL CODE, NFPA 70, ARTICLE 504. FOR CANADA, INSTALLATIONS MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1. WHERE APPLICABLE, CKT1, CKT2, CKT3, AND CKT4 MUST BE IN COMPLIANCE WITH EN50039 CLAUSE 5.3.2; TYPE B CABLE
3- LOOP BARRIER: R. STAHL INC. PART NO. 9160/13-11-11
LOGIC BARRIER: R. STAHL INC. PART NO. 9002/77-280-094-00
4- THE LENGTH OF THE CABLES WILL BE RESTRICTED TO THE FOLLOWING VALUES:

CIRCUIT	GROUP	C(uF)	L(mH)	CABLE LENGTH
CKT1	A,B	0.14uF	4.4mH	2,333 FT MAX
CKT1	C,E	0.43uF	17.2mH	7,167 FT MAX
CKT1	D,F,G	1.1uF	35.7mH	18,333 FT MAX
CKT2,3,4	A,B	0.14uF	18.5mH	2,333 FT MAX
CKT2,3,4	C,E	0.41uF	67mH	6,833 FT MAX
CKT2,3,4	D,F,G	1.1uF	155mH	18,333 FT MAX

FOR INTRINSIC SAFETY PURPOSES, THE MAXIMUM CABLE LENGTH WAS CALCULATED USING A CAPACITANCE OF 60 pF/FT AND AN INDUCTANCE OF 0.20uH/FT PER UL913.
5- WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.
6- THE BARRIERS MUST NOT BE CONNECTED TO ANY DEVICE WHICH USES OR GENERATES IN EXCESS OF 250 VOLTS RMS OR DC UNLESS IT HAS BEEN DETERMINED THAT THE VOLTAGE HAS BEEN ADEQUATELY ISOLATED FROM THE BARRIERS.
7- LOOP SUPPLY VOLTAGE: 24 VDC ±10%, LOGIC SUPPLY VOLTAGE: 24 VDC ±10%.

8- CERTIFIED ASSOCIATED APPARATUS WITH APPLICABLE DIVISION AND GROUP OR ZONE AND GROUP APPROVAL WITH ENTITY PARAMETERS:

DIVISIONS	ZONES	Transmitter Paramters	Alarm and Pulse Paramters
Voc ≤ Vmax	Uo ≤ Ui	Vmax=Ui=30	Vmax=Ui=30
Isc ≤ Imax	Io ≤ Ii	Imax=Ii=140mA	Imax=Ii=45
Ca ≥ Ci+Ccable	Co ≥ Ci+Ccable	Ci=0.015 uF	Ci=0
La ≥ Li+Lcable	Lo ≥ Li+Lcable	Li=0	Li=0

The Entity Concept allows interconnection of intrinsically safe and associated apparatus not specifically examined in combination as a system, when the approved values of Voc (or Uo) and Isc (or Io) for the associated apparatus are less than or equal to Vmax (or Ui) and Imax (or Ii) for the intrinsically safe apparatus, and the values of Ca (Co) and La (Lo) for the associated apparatus are greater than Ci + Ccable, Li + Lcable.

Ref. No.981Y005 - Rev. F Sheet 2 of 2

Figure 1-6 Transmitter with Alarm and Pulse Outputs Wiring Diagram

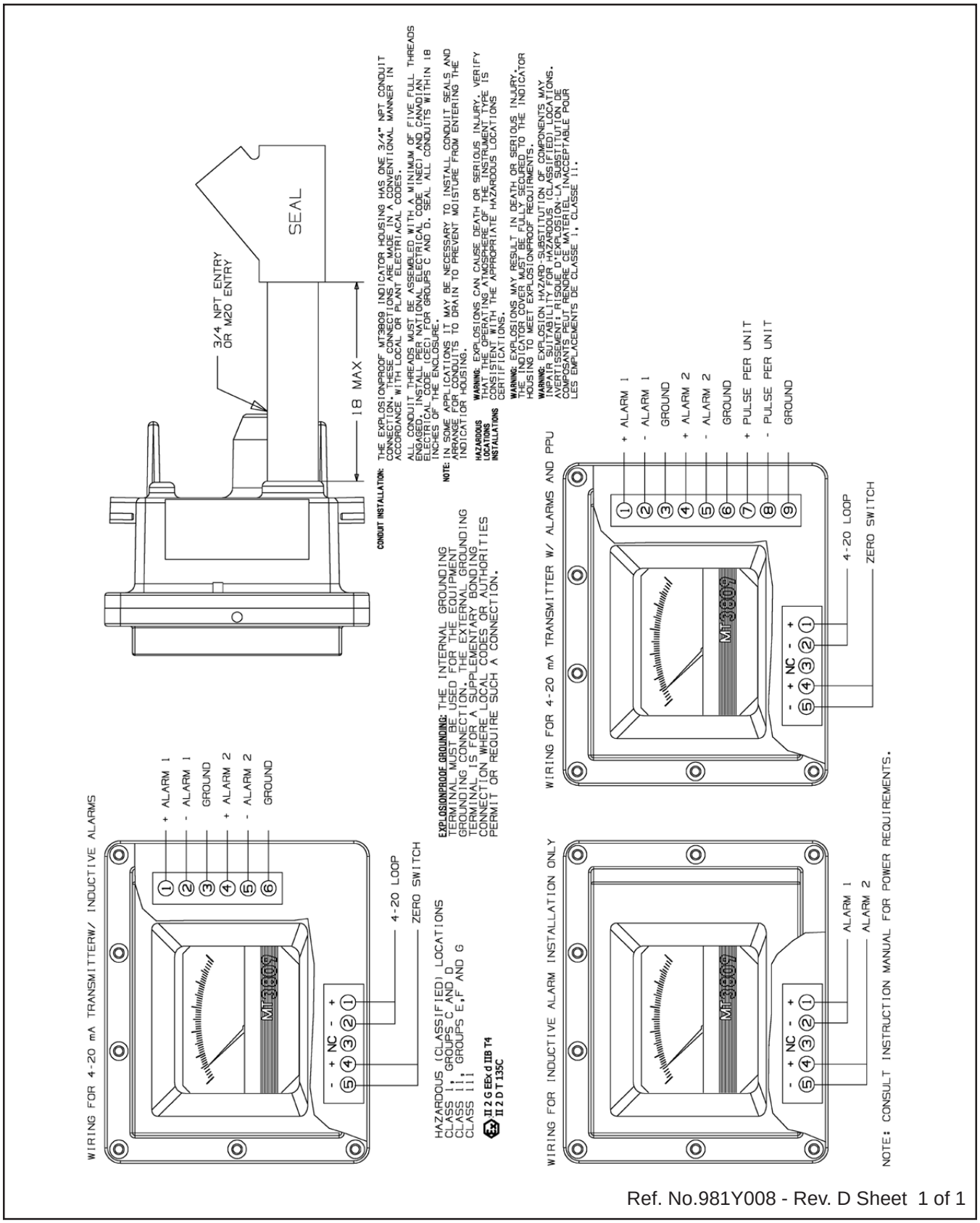

SEAL
3/4 NPT ENTRY
OR M20 ENTRY
18 MAX
CONDUIT INSTALLATION:
THE EXPLOSIONPROOF MT3809 INDICATOR HOUSING HAS ONE 3/4" NPT CONDUIT CONNECTION. THESE CONNECTIONS ARE MADE IN A CONVENTIONAL MANNER IN ACCORDANCE WITH LOCAL OR PLANT ELECTRIACAL CODES.
ALL CONDUIT THREADS MUST BE ASSEMBLED WITH A MINIMUM OF FIVE FULL THREADS ENGAGED. INSTALL PER NATIONAL ELECTRICAL CODE (NEC) AND CANADIAN ELECTRICAL CODE (CEC) FOR GROUPS C AND D. SEAL ALL CONDUITS WITHIN 18 INCHES OF THE ENCLOSURE.
NOTE: IN SOME APPLICATIONS IT MAY BE NECESSARY TO INSTALL CONDUIT SEALS AND ARRANGE FOR CONDUITS TO DRAIN TO PREVENT MOISTURE FROM ENTERING THE INDICATOR HOUSING.
HAZARDOUS LOCATIONS INSTALLATIONS
WARNING: EXPLOSIONS CAN CAUSE DEATH OR SERIOUS INJURY. VERIFY THAT THE OPERATING ATMOSPHERE OF THE INSTRUMENT TYPE IS CONSISTENT WITH THE APPROPRIATE HAZARDOUS LOCATIONS CERTIFICATIONS.
WARNING: EXPLOSIONS MAY RESULT IN DEATH OR SERIOUS INJURY. THE INDICATOR COVER MUST BE FULLY SECURED TO THE INDICATOR HOUSING TO MEET EXPLOSIONPROOF REQUIRMENTS.
WARNING: EXPLOSION HAZARD-SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS (CLASSIFIED) LOCATIONS.
AVERTISSEMENT: RISQUE D'EXPLOSION-LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE 1, CLASSE 11.
EXPLOSIONPROOF GROUNDING: THE INTERNAL GROUNDING TERMINAL MUST BE USED FOR THE EQUIPMENT GROUNDING CONNECTION. THE EXTERNAL GROUNDING TERMINAL IS FOR A SUPPLEMENTARY BONDING CONNECTION WHERE LOCAL CODES OR AUTHORITIES PERMIT OR REQUIRE SUCH A CONNECTION.
HAZARDOUS (CLASSIFIED) LOCATIONS
CLASS I, GROUPS C AND D
CLASS II, GROUPS E,F AND G
CLASS III
II 2 G EEx d IIB T4
II 2 D T 135C
WIRING FOR 4-20 mA TRANSMITTERW/ INDUCTIVE ALARMS
+ ALARM 1
- ALARM 1
GROUND
+ ALARM 2
- ALARM 2
GROUND
4-20 LOOP
ZERO SWITCH
MT3809
- + NC - +
WIRING FOR 4-20 mA TRANSMITTER W/ ALARMS AND PPU
+ ALARM 1
- ALARM 1
GROUND
+ ALARM 2
- ALARM 2
GROUND
+ PULSE PER UNIT
- PULSE PER UNIT
GROUND
4-20 LOOP
ZERO SWITCH
WIRING FOR INDUCTIVE ALARM INSTALLATION ONLY
ALARM 1
ALARM 2
NOTE: CONSULT INSTRUCTION MANUAL FOR POWER REQUIREMENTS.
Ref. No.981Y008 - Rev. D Sheet 1 of 1

Figure 1-7 Model MT3809 Explosion-Proof Housing Wiring Diagram

1-7 Microprocessor Transmitter with Inductive Alarms

This combined system provides both the sophistication of the microprocessor along with the simplicity of one or two switch inductive alarms. Specifications for the transmitter are as stated previously and specifications for the front adjustable inductive alarms are as follows. For Wiring Diagrams, Refer to Figures 1-8 and 1-9.

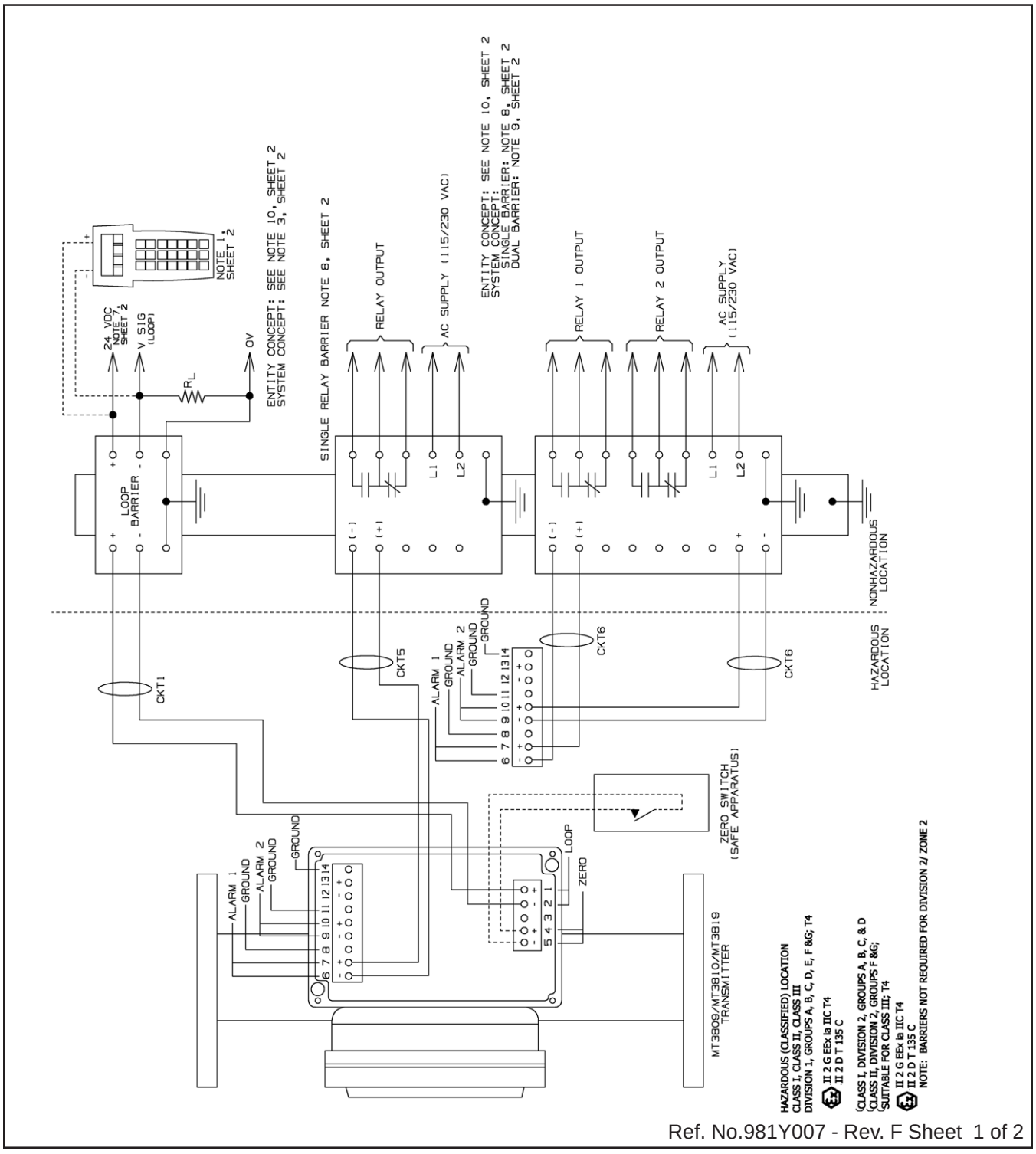

24 VDC NOTE 7, SHEET 2
V SIG (LOOP)
0V
RL
NOTE 1, SHEET 2
ENTITY CONCEPT: SEE NOTE 10, SHEET 2
SYSTEM CONCEPT: SEE NOTE 3, SHEET 2
SINGLE RELAY BARRIER NOTE 8, SHEET 2
RELAY OUTPUT
AC SUPPLY (115/230 VAC)
ENTITY CONCEPT: SEE NOTE 10, SHEET 2
SYSTEM CONCEPT:
SINGLE BARRIER: NOTE 8, SHEET 2
DUAL BARRIER: NOTE 9, SHEET 2
RELAY 1 OUTPUT
RELAY 2 OUTPUT
AC SUPPLY (115/230 VAC)
LOOP BARRIER
L1
L2
NONHAZARDOUS LOCATION
HAZARDOUS LOCATION
CKT1
CKT5
CKT6
CKT6
ALARM 1
GROUND
ALARM 2
GROUND
GROUND
ZERO SWITCH (SAFE APPARATUS)
LOOP
ZERO
MT3809/MT3810/MT3819 TRANSMITTER
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, CLASS II, CLASS III
DIVISION 1, GROUPS A, B, C, D, E, F &G; T4
II 2 G EEx ia IIC T4
II 2 D T 135 C
(CLASS I, DIVISION 2, GROUPS A, B, C, & D
CLASS II, DIVISION 2, GROUPS F &G;
SUITABLE FOR CLASS III; T4
II 2 G EEx ia IIC T4
II 2 D T 135 C
NOTE: BARRIERS NOT REQUIRED FOR DIVISION 2/ ZONE 2
Ref. No.981Y007 - Rev. F Sheet 1 of 2

Figure 1-8 Transmitter with Inductive Alarm Wiring Diagram

NOTES:
1- THIS DEVICE IS A ROSEMOUNT MODEL 275 HAND HELD COMMUNICATOR.
2- CKT1, CKT5, AND CKT6 MUST RUN IN SEPARATE CABLES OR IN ONE CABLE WHICH HAS SUITABLE INSULATION. REFER TO INSTRUMENT SOCIETY OF AMERICA (ISA) RECOMMENDED PRACTICE RP12.6 FOR INSTALLING INTRINSICALLY SAFE LOOPS AND THE NATIONAL ELECTRICAL CODE, NFPA 70, ARTICLE 504. FOR CANADA, INSTALLATIONS MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1. WHERE APPLICABLE, CKT1, CKT5, AND CKT6 MUST BE IN COMPLIANCE WITH EN50039 CLAUSE 5.3.2; TYPE B CABLE
3- LOOP BARRIER: R. STAHL INC. PART NO. 9160/13-11-11

4- THE LENGTH OF THE CABLES WILL BE RESTRICTED TO THE FOLLOWING VALUES:

CIRCUIT	GROUP	C(uF)	L(mH)	CABLE LENGTH	BARRIER NO.
CKT1	A,B	0.14uF	4.4mH	2,333 FT MAX	9002/13-280-093-00
CKT1	C,E	0.43uF	17.2mH	7,167 FT MAX	9002/13-280-093-00
CKT1	D,F,G	1.1uF	35.7mH	18,333 FT MAX	9002/13-280-093-00
CKT5,6	A,B	1.27uF	8.48mH	21,167 FT MAX	KFD2-SR-Ex2.W
CKT5,6	C,E	3.82uF	2.99mF	63,667 FT MAX	KFD2-SR-Ex2.W
CKT5,6	D,F,G	1.02uF	7.44mF	169,667 FT MAX	KFD2-SR-Ex2.W
CKT5,6	A,B	1.26uF	8.48mH	21,167 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	C,E	3.82uF	2.99mF	63,667 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	D,F,G	1.02uF	7.44mF	169,667 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	A,B	6.00uF	3.40mH	10,000 FT MAX	WE77/EX1-2U
CKT5,6	C,E	2.50uF	1.30mF	41,667 FT MAX	WE77/EX1-2U
CKT5,6	D,F,G	7.50uF	3.00mF	125,000 FT MAX	WE77/EX1-2U

FOR INTRINSIC SAFETY PURPOSES, THE MAXIMUM CABLE LENGTH WAS CALCULATED USING A CAPACITANCE OF 60 pF/FT AND AN INDUCTANCE OF 0.20uH/FT PER UL913.
5- WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.
6- THE BARRIERS MUST NOT BE CONNECTED TO ANY DEVICE WHICH USES OR GENERATES IN EXCESS OF 250 VOLTS RMS OR DC UNLESS IT HAS BEEN DETERMINED THAT THE VOLTAGE HAS BEEN ADEQUATELY ISOLATED FROM THE BARRIERS.
7- LOOP SUPPLY VOLTAGE: 24 VDC ±10%, LOGIC SUPPLY VOLTAGE: 24 VDC ±10%.

8- SINGLE RELAY BARRIER:
PEPPERL & FUCHS (WE77/EX1)-115 VAC, 45-60 HZ — RELAY RATINGS (PEPPERL & FUCHS WE77/EX1)
(WE77/EX1-220)-230 VAC, 45-60 HZ — AC V MAX ≤ 250 VAC
(KFA5-SR2-EX1.W 115 VAC, 45-65 HZ) — I MAX ≤ 4 AMP
(KFA6-SR2-EX1.W 230 V, 45-65 HZ) — P MAX ≤ 500 VA/Cos 0=0.7
9- DUAL RELAY BARRIER: — DC 110 VDC/0.2 AMP
PEPPERL & FUCHS (WE77/EX2)-115 VAC, 45-60 HZ — 60 VDC/0.6 AMP
(WE77/EX2-220)-230 VAC, 45-60 HZ — 24 VDC/4.0 AMP
(KFA5-SR2-EX2.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EX2.W 230 V, 45-65 HZ)

RELAY RATINGS (PEPPERL & FUCHS KFA5/KFA6)
AC V MAX ≤ 250 VAC
I MAX ≤ 2 AMP
P MAX 253V/2A Cos0>=0.7
DC 40V/2A RESISTIVE LOAD

DC POWERED BARRIER
MTL 4016 - 20-35 VDC
45-60 mA
REED RELAY CONTACT RATINGS
10 WATTS, 0.5 A, 35 VDC
RESPONSE TIME 2MSEC MAX
NOTE: REACTIVE LOADS MUST BE ADEQUATELY SUPPRESSED.
PEPPERL & FUCHS
KFD2-SR2-EX2.W
POWER SUPPLY 20-30 VDC, 50 MA MAX
Voc=8V, Isc=8 MA
SWITCH POINT/SWITCHING HYSTERESIS 1.2 MA-2.1 MA/≈0.2 MA
INPUT PULSE LENGTH/INPUT PULSE PAUSE≥20 MSEC/≥20 MSEC
OUTPUT: AC 250V/2A/Cos0>=0.7
DC 40V/2A RESISTIVE
RESPONSE TIME≈20 MSEC

10- Certified associated apparatus with applicable division and group or zone and group approval with entity parameters:

DIVISIONS	ZONES	Transmitter Parameters	Alarm and Pulse Parameters
Voc ≤ Vmax	Uo ≤ Ui	Vmax=Ui=30	Vmax=Ui=16
Isc ≤ Imax	Io ≤ Ii	Imax=Ii=140mA	Imax=Ii=25 mA
Ca ≥ Ci+Ccable	Co ≥ Ci+Ccable	Ci=0.015 uF	Ci=50nF
La ≥ Li+Lcable	Lo ≥ Li+Lcable	Li=0	Li=250 uH

The Entity Concept allows interconnection of intrinsically safe and associated apparatus not specifically examined in combination as a system, when the approved values of Voc (or Uo) and Isc (or Io) for the associated apparatus are less than or equal to Vmax (or Ui) and Imax (or Ii) for the intrinsically safe apparatus, and the values of Ca (Co) and La (Lo) for the associated apparatus are greater than Ci + Ccable, Li + Lcable.

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Figure 1-9 Transmitter with Inductive Alarm Wiring Notes

1-8 Inductive Alarm Switches

A. Design
- 1 or 2 normally open inductive limit switches
- Optional intrinsically safe power supply/amplifier/relay unit
- For low or high limit signaling/switching
- Front adjustable

B. Description
One or 2 electronic limit switches can be installed in the indicator housing to allow initiation of signaling or switching functions on a preset flow value. The limit switch operates as a slot initiator that is inductively actuated by a disc mounted on the pointer shaft. Any flow value can be used for setting the limit value by sliding the initiator along the indicator scale. Minimum setting distance between two limit switches is approximately 40% full scale. The position of the initiator also serves to visually indicate the set value. Settings can be adjusted by removing the indicator cover, loosening, moving and retightening of the alarm indication needle, and replacement of the indicator cover.

C. SPECIFICATIONS

EMC Directive 89/336/EEC: EN 50081, EN 50082 and EN 61326-1

Hazardous Location Classification
Enclosure: Type 4X/ IP65

Ambient Temperature: -22°F≥ Tamb ≤ 150°F (-30°C ≥ Tamb ≤ 65°C)
Intrinsically Safe
United States and Canada UL Listed, E73889, Vol. 1, Sect. 15
Class I, II and III, Division 1, Groups A, B, C, D, E, F, and G; T4

Europe – KEMA 01ATEX1235 X

II 2 G EEx ia IIC T4
II 2 D T135°C

Entity Parameters:
Ui=Vmax=30 Vdc; Ii=Imax=140 mA; Ci= 0.015 uF;
Li= 0 mH

Non-Incendive
United States and Canada UL Listed, E73889, Vol. 1, Sect. 15
Class I, II, III, Division 2, Groups A, B, C,D F, and G; T4

Europe – KEMA 01ATEX1236

II 3 G EEx nA II T4
II 3 D T135°C

Explosion- proof/ Flame-proof
United States and Canada UL Listed, E73889, Vol. 1, Sect. 14
Class I, Division 1, Groups C, D;
Dust Ignition-proof, Class II, Division 1, Groups E, F, G; Class III; T4

Europe – KEMA 01ATEX2207 X

II 2 G EEx d IIB T4
II 2 D T135°C

Power Supply
5-25 Vdc; 25 mA max.

Impedance
Approximately 1 kohm with cam absent
Approximately 8 kohm with cam present

Maximum Operating Temperature
Refer to Table 1-3

Alarm Wiring Diagrams
Explosion-proof/ Flame-proof: Refer to Figure 1-7

Intrinsically Safe or Non Incendive: Refer to Figures 1-8 and 1-9

For Division 1 explosion proof installations, the optional explosion proof enclosure must be used. This enclosure does not use the auxiliary terminal box, as shown on some of the installation diagrams. All connections are made directly within the housing. Cable entry device shall be certified as Flame-proof type, suitable per the conditions of use and correctly installed. If used with conduit, refer to Figure 1-7, a sealing device shall be provided in accordance with Figure 1-7.

For Division 2 non-incendive installations, either the standard enclosure or the explosion proof enclosure may be used.
For both Division 1 explosion proof and Division 2 non-incendive installations, the barriers shown in the installation drawings are unnecessary. However, NEC Class 2 circuits are required.

The circuits shall be wired separately or using a Multicore Cable Type B, in accordance with EN 60079-14. Also wiring must be done in accordance with the applicable electrical codes, ie., NEC Chapter 5, CEC Section 18 and any local codes.

Alarm Accessories
Amplifier Power Supply (approved isolated barrier) 1 or 2 channel approved for intrinsically safe application, remotely mounted, 115 or 230 Vac power. Single pole with double throw (SPDT) relay standard. For other configurations, consult factory.

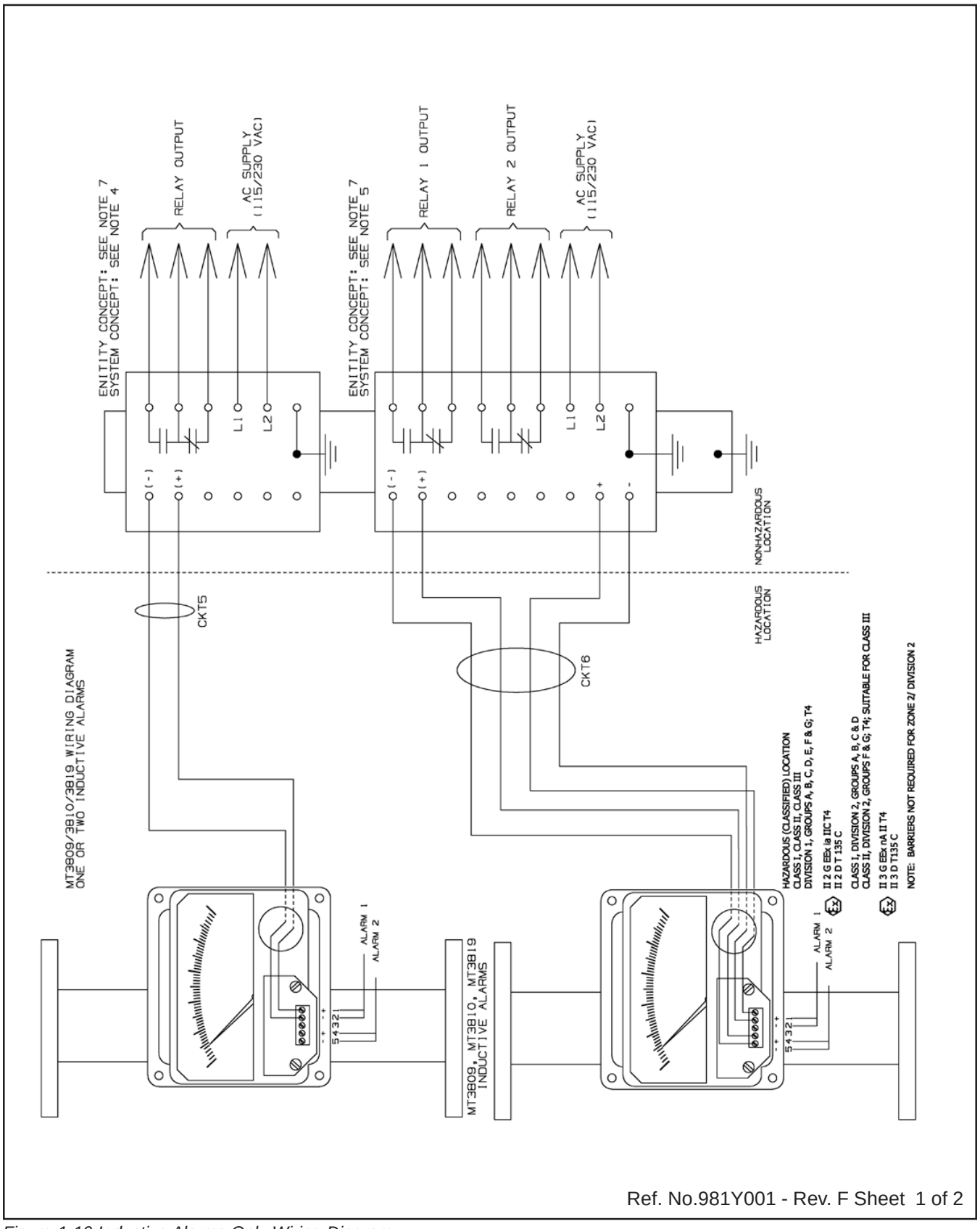
ENTITY CONCEPT: SEE NOTE 7
SYSTEM CONCEPT: SEE NOTE 4
RELAY OUTPUT
AC SUPPLY (115/230 VAC)
ENTITY CONCEPT: SEE NOTE 7
SYSTEM CONCEPT: SEE NOTE 5
RELAY 1 OUTPUT
RELAY 2 OUTPUT
AC SUPPLY (115/230 VAC)
L1
L2
NONHAZARDOUS LOCATION
HAZARDOUS LOCATION
CKT5
CKT6
MT3809/3810/3819 WIRING DIAGRAM
ONE OR TWO INDUCTIVE ALARMS
ALARM 1
ALARM 2
MT3809, MT3810, MT3819
INDUCTIVE ALARMS
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, CLASS II, CLASS III
DIVISION 1, GROUPS A, B, C, D, E, F & G; T4
II 2 G EEx ia IIC T4
II 2 D T 135 C
CLASS I, DIVISION 2, GROUPS A, B, C & D
CLASS II, DIVISION 2, GROUPS F & G; T4; SUITABLE FOR CLASS III
II 3 G EEx nA II T4
II 3 D T135 C
NOTE: BARRIERS NOT REQUIRED FOR ZONE 2/ DIVISION 2
Ref. No.981Y001 - Rev. F Sheet 1 of 2

Figure 1-10 Inductive Alarms Only Wiring Diagram

NOTES:

1- CKT5 AND CKT6 MUST RUN IN SEPARATE CABLES OR IN ONE CABLE WHICH HAS SUITABLE INSULATION. REFER TO INSTRUMENT SOCIETY OF AMERICA (ISA) RECOMMENDED PRACTICE RP12.6 FOR INSTALLING INTRINSICALLY SAFE LOOPS AND THE NATIONAL ELECTRICAL CODE, NFPA 70, ARTICLE 504. FOR CANADA, INSTALLATIONS MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART I.

THE LENGTH OF THE CABLES WILL BE RESTRICTED TO THE FOLLOWING VALUES:

CIRCUIT	GROUP	C (uF)	L (mH)	CABLE LENGTH	BARRIER NO.
CKT5,6	A,B	1.27uF	8.48mH	21,167 FT MAX	KFD2-SR2-Ex2.W
CKT5,6	C,E	3.82uF	2.99mF	63,667 FT MAX	KFD2-SR2-Ex2.W
CKT5,6	D,F,G	1.02uF	7.44mF	169,667 FT MAX	KFD2-SR2-Ex2.W
CKT5,6	A,B	1.26uF	8.48mH	21,167 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	C,E	3.82uF	2.99mF	63,667 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	D,F,G	1.02uF	7.44mF	169,667 FT MAX	KFA5/KFA6-SR2-Ex2.W
CKT5,6	A,B	6.00uF	3.40mH	10,000 FT MAX	WE77/EXI-2U
CKT5,6	C,E	2.50uF	1.30mF	41,667 FT MAX	WE77/EXI-2U
CKT5,6	D,F,G	7.50uF	3.00mF	125,000 FT MAX	WE77/EXI-2U

FOR INTRINSIC SAFETY PURPOSES, THE MAXIMUM CABLE LENGTH WAS CALCULATED USING A CAPACITANCE OF 60 pF/FT AND AN INDUCTANCE OF 1.20uH/FT PER UL913.

2- WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.

3- THE BARRIERS MUST NOT BE CONNECTED TO ANY DEVICE WHICH USES OR GENERATES IN EXCESS OF 250 VOLTS RMS OR DC UNLESS IT HAS BEEN DETERMINED THAT THE VOLTAGE HAS BEEN ADEQUATELY ISOLATED FROM THE BARRIERS.

4- SINGLE RELAY BARRIER:
PEPPERL & FUCHS (WE77/EXII-115 VAC, 45-60 HZ
(WE77/EXII-220)-230 VAC, 45-60 HZ
(KFA5-SR2-EXI.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EXI.W 230 V, 45-65 HZ)

5- DUAL RELAY BARRIER:
PEPPERL & FUCHS (WE77/EX2)-115 VAC, 45-60 HZ
(WE77/EX2-220)-230 VAC, 45-60 HZ
(KFA5-SR2-EX2.W 115 VAC, 45-65 HZ)
(KFA6-SR2-EX2.W 230 V, 45-65 HZ)

DC POWERED BARRIER
MTL 4016 - 20-35 VDC
45-60 mA
REED RELAY CONTACT RATINGS
10 WATTS, 0.5 A, 35 VDC
RESPONSE TIME 2MSEC MAX
NOTE: REACTIVE LOADS MUST BE ADEQUATELY SUPPRESSED.

PEPPERL & FUCHS
KFD2-SR2-EX2.W
POWER SUPPLY 20-30 VDC, 50 MA MAX
Voc=8V, Isc=8 MA
SWITCH POINT/SWITCHING HYSTERESIS 1.2 MA-2.1 MA/≈0.2 MA
INPUT PULSE LENGTH/INPUT PULSE PAUSE≥20 MSEC/≥20 MSEC
OUTPUT: AC 250V/2A/Cos0>0.7
DC 40V/2A RESISTIVE
RESPONSE TIME≈20 MSEC

RELAY RATINGS (PEPPERL & FUCHS WE77/EXII)
AC V MAX ≤ 250 VAC
I MAX ≤ 4 AMP
P MAX ≤ 500 VA/Cos 0=0.7
DC 110 VDC/0.2 AMP
60 VDC/0.6 AMP
24 VDC/4.0 AMP

RELAY RATINGS (PEPPERL & FUCHS KFA5/KFA6)
AC V MAX ≤ 250 VAC
I MAX ≤ 2 AMP
P MAX 253V/2A Cos0>=0.7
DC 40V/2A RESISTIVE LOAD

6- WHERE APPLICABLE,CKT5,CKT6, MUST BE IN COMPLIANCE WITH EN50039 CLAUSE 5.3.2; TYPE B CABLE.

7- CERTIFIED ASSOCIATED APPARATUS WITH APPLICABLE DIVISION AND GROUP OR ZONE AND GROUP APPROVAL WITH ENTITY PARAMTERS:

DIVISIONS	ZONES	PARAMETERS
Voc ≤ Vmax	Uo ≤ Ui	Vmax=Ui=16
Isc ≤ Imax	Io ≤ Ii	Imax=Ii=25 mA
Ca ≥ Ci + Ccable	Co ≥ Ci + Ccable	Ci=50nF
La ≥ Li + Lcable	Lo ≥ Li + Lcable	Li=250 uH

The Entity Concept allows interconnection of intrinsically safe and associated apparatus not specifically examined in combination as a system, when the approved values of Voc (or Uo) and Isc (or Io) for the associated apparatus are less than or equal to Vmax (or Ui) and Imax (or Ii) for the intrinsically safe apparatus, and the values of Ca (Co) and La (Lo) for the associated apparatus are greater than Ci + Ccable, Li + Lcable.

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Figure 1-11 Inductive Alarms Only Wiring Notes

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2-1 General

This section contains the procedures for the receipt and installation of the instrument. See Section 1 for dimensional and connection requirements. Do not attempt to start the system until the instrument has been permanently installed. It is important that the start-up procedures be followed in the exact sequence presented.

2-2 Receipt of Equipment

When the instrument is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to your nearest Product Service Department.

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554-FLOW (3569)
Tel (215) 362-3700
Fax (215) 362-3745
E-mail: BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, Netherlands
P.O. Box 428
6710 BK Ede, Netherlands
Tel 31-318-549-300
Fax 31-318-549-309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7100
Fax 011-81-3-5633-7101
Email: BrooksAs@BrooksInstrument.com

Remove the envelope containing the packing list. Outside of your clean area, carefully remove the equipment from the packing case. Make sure spare parts are not discarded with the packing material. Inspect for damaged or missing parts.

2-3 Recommended Storage Practice

If intermediate or long-term storage of equipment is required, it is recommended that the equipment be stored in accordance with the following:

a. Within the original shipping container.

b. In a sheltered area preferably a warm, dry heated warehouse.

c. Ambient temperature 21°C (70°F) nominal, 40°C (104°F) maximum and 7°C (45°F) minimum.

d. Relative humidity 45% nominal, 60% maximum and 25% minimum.

2-4 Return Shipment

Prior to returning any instrument to the factory, contact your nearest Brooks location for a Return Materials Authorization Number (RMA#). This can be obtained from one of the following locations:

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554-FLOW (3569)
Tel (215) 362-3700
Fax (215) 362-3745
E-mail: BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, Netherlands
P.O. Box 428
6710 BK Ede, Netherlands
Tel 31-318-549-300
Fax 31-318-549-309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7100
Fax 011-81-3-5633-7101
Email: BrooksAs@BrooksInstrument.com

Instrument must have been purged in accordance with the following:

⚠ WARNING

Before returning the instrument to the factory purge thoroughly with a dry inert gas such as Nitrogen before disconnecting gas connections. Failure to correctly purge the instrument could result in fire, explosion or death. Corrosion or contamination may occur upon exposure to air.

Completion of form RPR003-1, Brooks Instrument Decontamination Statement. A copy of this form can be downloaded from the Brooks website www.brooksinstrument.com or is available from any Brooks Instrument location listed above. This is required before any Brooks Personnel can begin processing. Copies of the form can be obtained from any Brooks Instrument location listed above. Provide a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument.

2-5 Transit Precautions

To safeguard against damage during transit, transport the instrument to the installation site in the same container used for transportation from the factory if circumstances permit.

2-6 Removal from Storage

Upon removal from storage, a visual inspection should be conducted to verify the condition of the equipment is “as received.” If the equipment has been in storage in conditions in excess of those recommended (See Section 2-3), the device should be subjected to a pneumatic pressure test in accordance with applicable vessel codes.

2-7 Installation of Flowmeter

⚠ WARNING

If the inlet and outlet valves adjacent to the indicator are to be closed for any reason, the indicator must be completely drained. Failure to do so may result in thermal expansion of the liquid which can rupture the meter and cause possible personal injury.

Recommended installation for Models MT 3809 and MT 3819 is as follows:

a. Carefully remove the covers from each end of the flowmeter.
b. Install the flowmeter with the inlet at the bottom and the outlet at the top.
c. When installing the flowmeter in the process line, follow accepted plumbing practices for flanged or NPT fittings.
d. Install the flowmeter within 5° of true vertical. Use of a level is recommended to determine the proper alignment.
e. Installation of a bypass piping arrangement is recommended, Figure 2-1. Bypass piping permits the meter to be isolated from the flow line for servicing and cleaning.

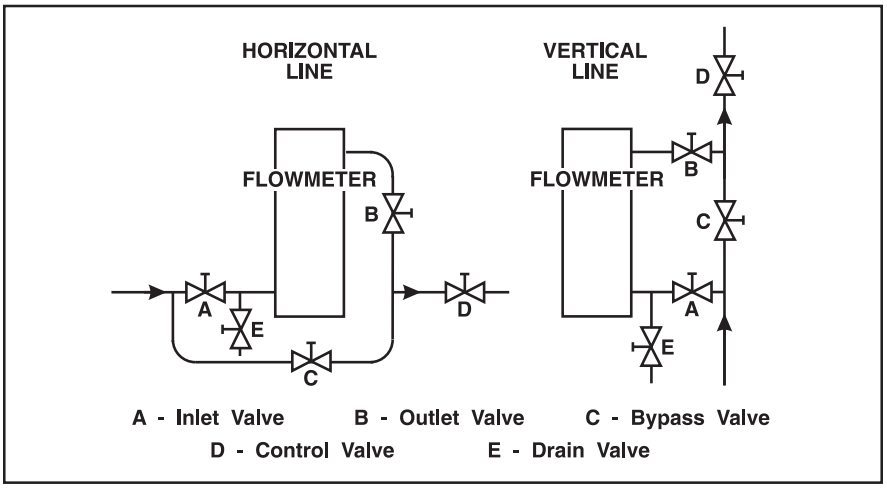

Figure 2-1 Typical Bypass Installation

2-8 Installation of Models MT 3809 and MT 3819 Flowmeters with a Smart Meter Manager Transmitter with or without Optional Alarms and Pulse Output

a. Install the meter as described in Section 2-4.
b. Transmitter setup is done solely through proper system wiring and parameter configuration. Common transmitter parameters are set by Brooks prior to shipment. These parameters, such as flow rate, are set based on order information, meter configuration or defaults inherent to the transmitter. If requested when ordering the electronics, all parameters will be set prior to receiving the unit and no further configuration will be needed at installation. However, more detailed configurations as well as on-line monitoring can be done through standard HART communication protocol, or can be set using an Emerson™ Model 275 Hand-held communicator. See Operations Section 3 for manual programming details.

   With a HART protocol compatible transmitter, the digital communication signals are superimposed on top of the 4-20 mA signal. Communication of more than just the process variables is possible. Plants utilizing HART compatible transmitters can increase productivity by reducing trips to the field, gather data needed to reduce process downtime, proactively perform maintenance rather than reactively, and transport data to the field and back to the shop. Also, with the Emerson Process Management Asset Management Solutions™ software (AMS), information may be moved from the Model 275 Communicator to your personal computer.

   The 2-wire, 4-20 mA analog output provides real-time information on process flow rate. The 1200 baud, HART communication data is overlaid and transmitted on the 4-20 mA signal. Refer to Figure 2-2 for SMM electrical configuration. The float is constructed with an integral magnet that activates a magnetic sensor that is part of the transmitter. This same float magnet also drives the mechanical pointer.
   The flow rate is scalable by setting independent high and low range parameters. The Analog Output (AO) transmitter parameters, AO Hi-Range and AO Lo-Range span the 4-20 mA signal. For example, if flow rate is normally between 100 and 500 gpm, the AO Hi-Range parameter is set at 500 and the AO Lo-Range is set at 100. Like other common parameters, the AO Hi-Range and AO Lo-Range can be set by Brooks prior to shipment.

c. Microprocessor Transmitter Wiring Connections
   Refer to Figures 1-3, 1-4, 1-5 and 1-6 for detailed UL approved wiring hookup. Figures 2-3 through 2-6 are schematic drawings showing typical electronic hookups.

⚠ CAUTION

Since this is a magnetically activated device, strong magnetic fields and materials with magnetic properties may cause faulty operation when in close proximity to the flowmeter. This includes steel pipes, steel conduit, motors, and transformers.

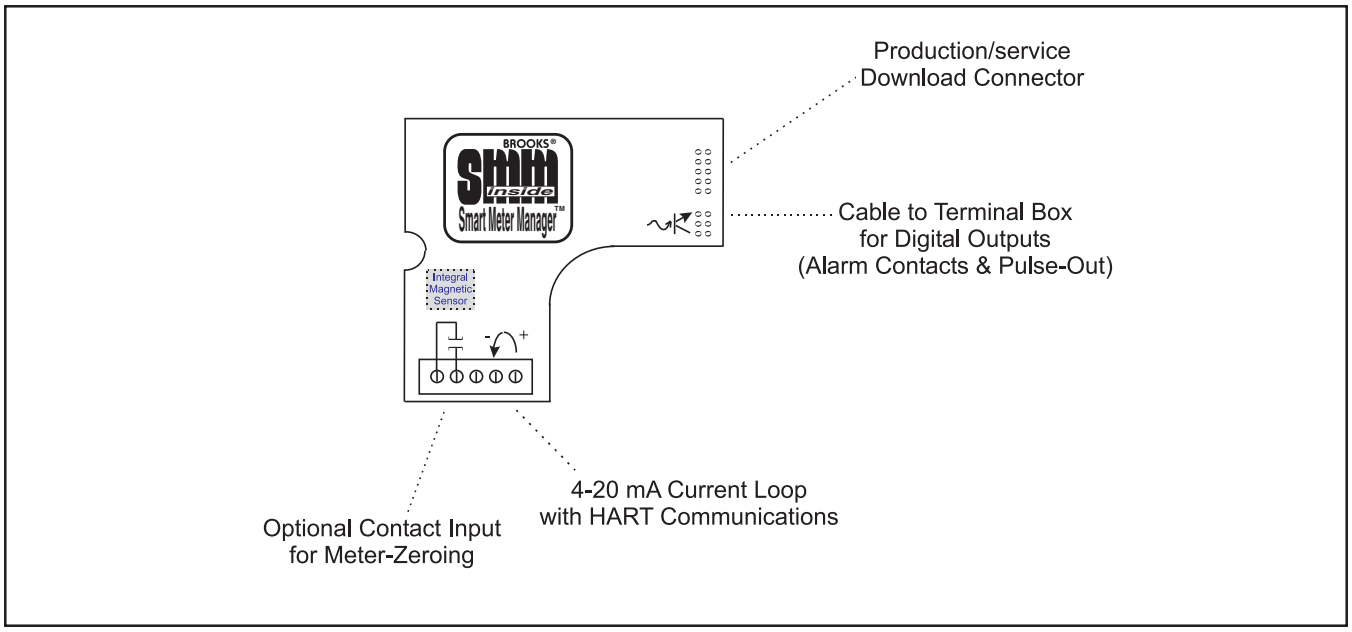

Figure 2-2 Smart Meter Manager Electrical Configuration

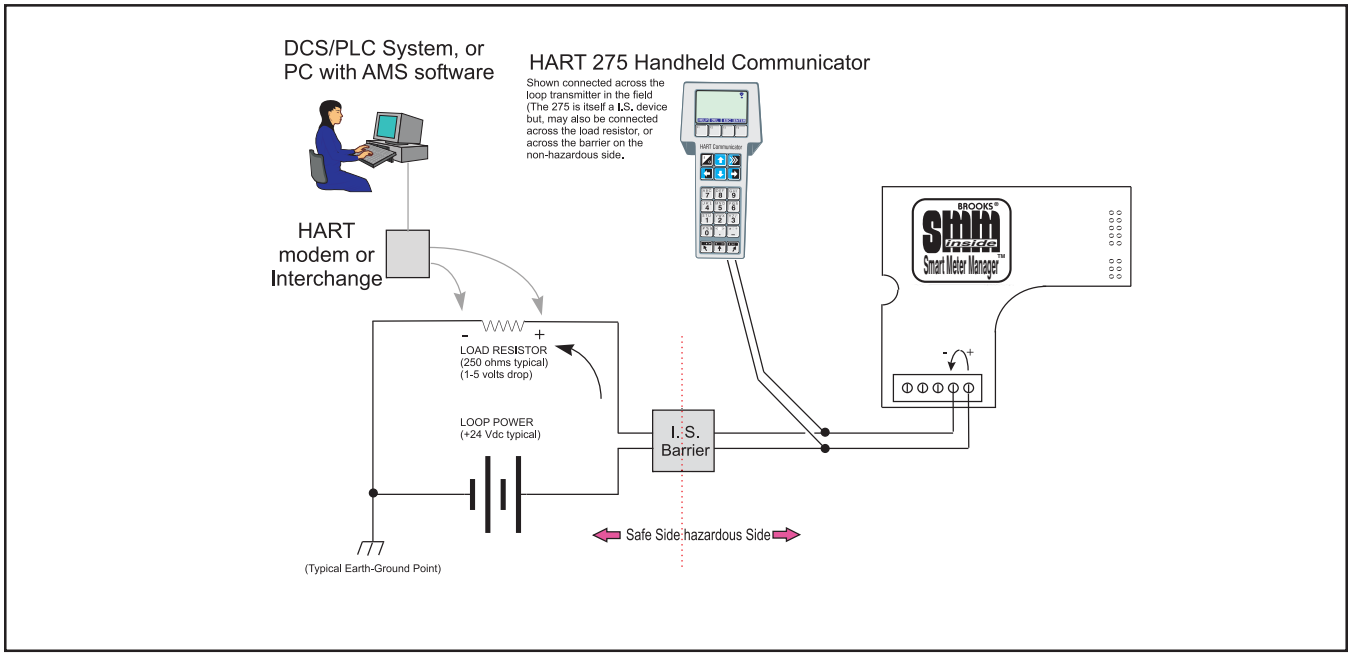
DCS/PLC System, or
PC with AMS software
HART 275 Handheld Communicator
Shown connected across the loop transmitter in the field (The 275 is itself a I.S. device but, may also be connected across the load resistor, or across the barrier on the non-hazardous side.
HART
modem or
Interchange
LOAD RESISTOR
(250 ohms typical)
(1-5 volts drop)
LOOP POWER
(+24 Vdc typical)
I. S.
Barrier
Safe Side hazardous Side
(Typical Earth-Ground Point)

Figure 2-3 Typical SMM Transmitter Analog Output and Power Wiring

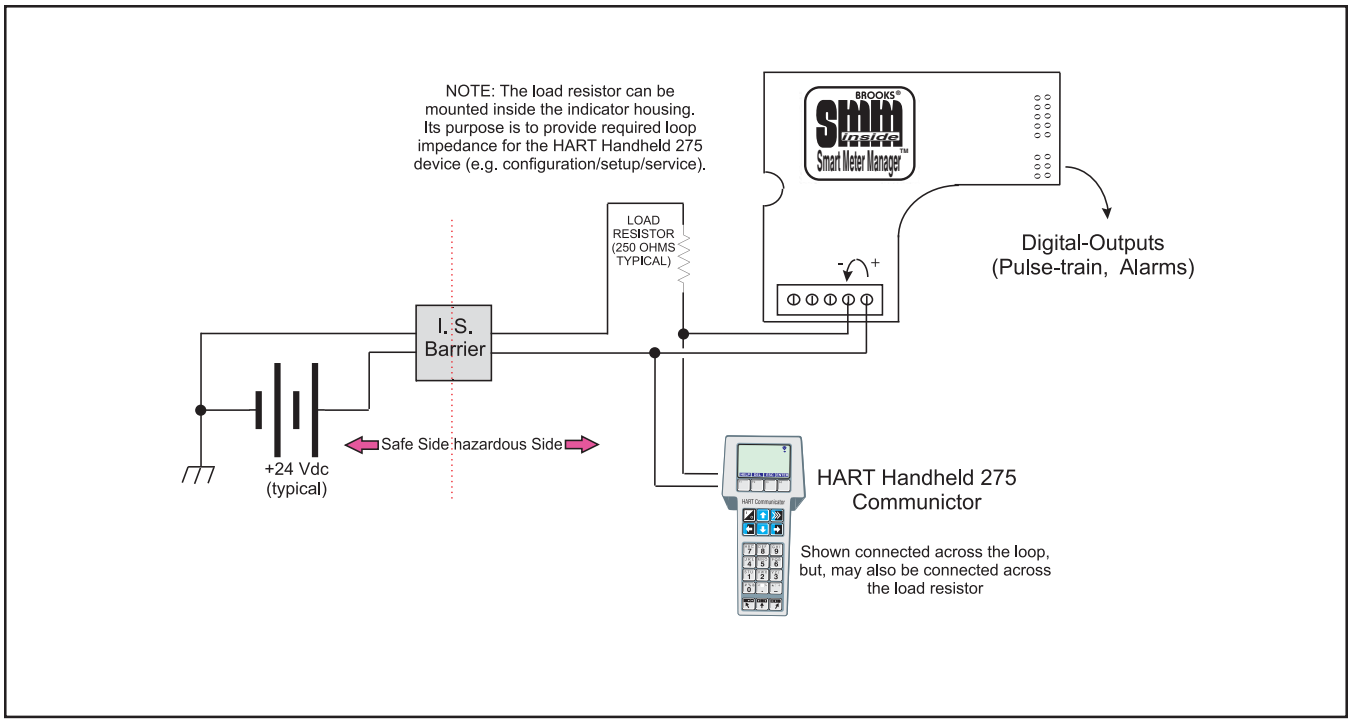
NOTE: The load resistor can be mounted inside the indicator housing. Its purpose is to provide required loop impedance for the HART Handheld 275 device (e.g. configuration/setup/service).
LOAD RESISTOR (250 OHMS TYPICAL)
I. S. Barrier
Safe Side hazardous Side
+24 Vdc (typical)
Digital-Outputs (Pulse-train, Alarms)
HART Handheld 275 Communictor
Shown connected across the loop, but, may also be connected across the load resistor

Figure 2-4 Alternate SMM Transmitter Analog Output and Power Wiring (Where 4-20 mA signal is not required)

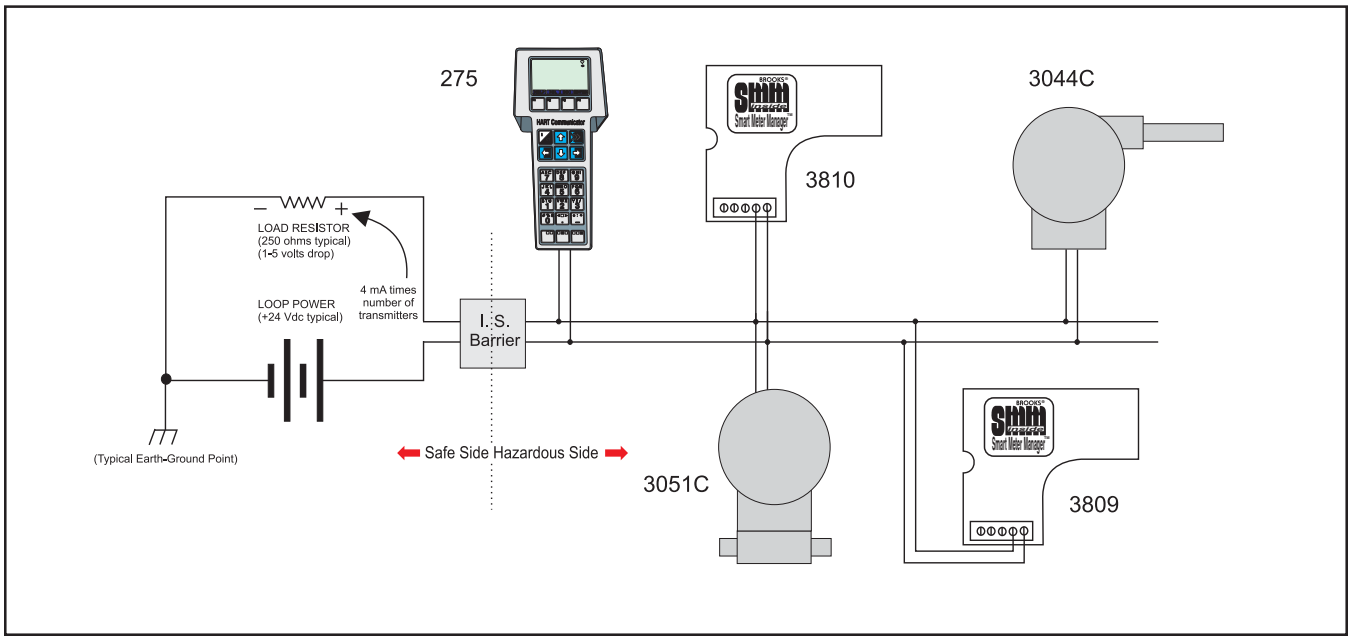

Figure 2-5 Multi-drop SMM Transmitter Analog Output and Power Wiring

⚠CAUTION

Flowmeters with a transmitter must be mounted at least 18 inches apart to prevent the interaction of adjacent float magnets and transmitters.

⚠WARNING

To prevent igniton of hazardous atmospheres and serious personal injury, proper installation methods must be used as defined in article 505 of the National Electrical Code, and the Canadian Electrical Code and ISA Standard 12.6.

Typically applications require only the use of the 2 wire loop analog signal. In some applications where transmitters and actuators are widely separated (e.g. tank farms), devices are wired in a multi-drop configuration to save wiring costs. Each unit is given an individual HART address in the range of 1-15 to distinguish each unit during communications over a common wire pair. In this configuration, the 4-20 mA output signal cannot be used.

To install the typical transmitter analog output configuration:

1. For intrinsically safe installation, intrinsic safety barrier selection, cable parameters, and power supply limits must be in accordance with the entity parameters shown in Figure 1-3. Alternatively, the optional intrinsically safe power supply available from Brooks may be used. Cable parameters for inductance and capacitance still apply.
2. If the area classification is Division 2, a barrier is not required and cable parameters are not applicable. The electrical code will require the use of conduit for wire protection. Refer to Figure 1-3.
3. If the installation is to be protected by Division 1 explosion proof methods, the optional explosion proof enclosure is required and explosion proof installation methods must be followed. Refer to Fig.1-5.
4. and should be taped up and not connected at the receiver end. Insulation of the shield at the receiving end is especially important for intrinsically safe installations.
5. The maximum resistance of the loop resistor, the associated cable and the barrier is determined by the power supply voltage and is shown graphically in Figure 1-2.
6. After installation and powering of the loop, the transmitter must be zeroed, both electrically and mechanically. This operation will compensate for any stray magnetic effects in the vicinity of the transmitter. Flow must be verified to be zero when the zero function is momentarily activated.

   With the float at the zero flow position, set zero flow by either shorting the two pins together at the terminal block. If desired, a zero switch can be remotely mounted and wired to these terminals. The hazardous area classification will determine the wiring methods used for this switch.

   The pointer must also be adjusted to the reference line on the scale using the adjustment screw on the face of the pointer, next to the hub. The zero function may be activated as part of a periodical maintenance check.

7. Under actual flow conditions, verify that the transmitter output matches the mechanical pointer position. If a discrepancy is noted, the HART communications channel can be used to verify or adjust the transmitter settings. The Emerson Model 275 hand held communicator provides a simple means to accomplish this check anywhere in the loop. Refer to Figure 3-2 for connection instructions.
   Note: The Brooks SMM transmitter device description (DD) will not be programmed into the Emerson Model 275 hand-held communicators until after Summer 1997. Until the Brooks device description becomes standard to the Emerson Model 275 units, please contact Brooks Customer Service, Hatfield, PA, to provide programming for a nominal fee. After Summer 1997**,** we request that the customers update their Model 275 units through Emerson Service Centers located throughout the world.

d. Microprocessor Transmitter with Alarm and Pulse Output Wiring Connections.

⚠CAUTION

Since this is a magnetically activated device, strong magnetic fields and materials with magnetic properties may cause faulty operation when in close proximity to the flowmeter. This includes steel pipes, steel conduit, motors, and transformers.

⚠CAUTION

Flowmeters with a transmitter must be mounted at least 18 inches apart to prevent the interaction of adjacent float magnets and transmitter.

⚠WARNING

To prevent ignition of hazardous atmospheres and serious personal injury, proper installation methods must be used as defined in Article 505 of the National Electrical Code and the Canadian Electrical Code and ISA Stnadard 12.6.

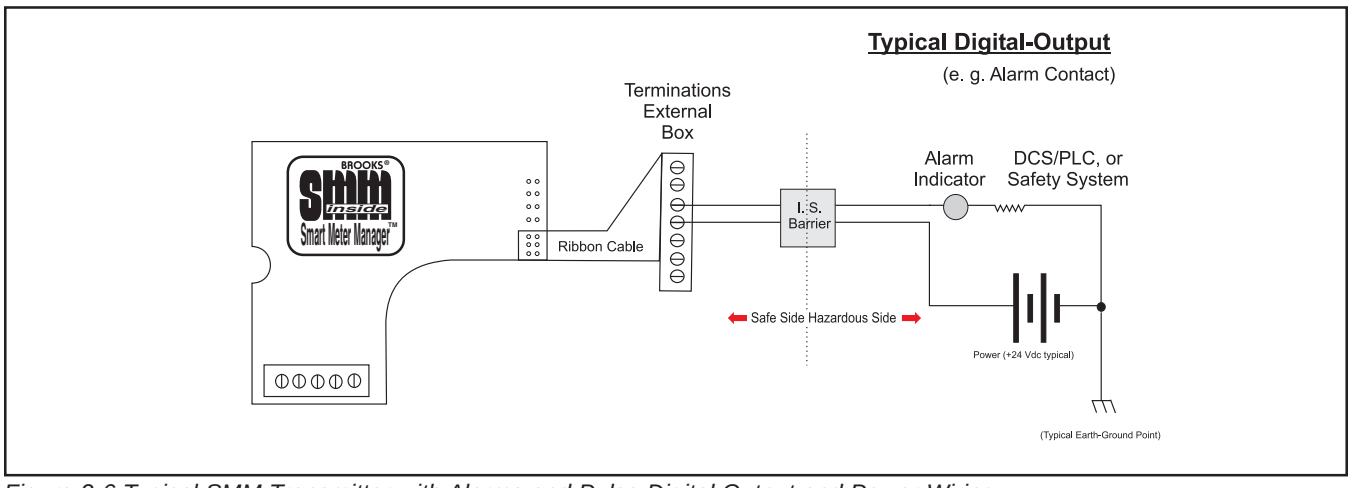

Figure 2-6 Typical SMM Transmitter with Alarms and Pulse Digital Output and Power Wiring

All internal parameters can be accessed over the HART communications channel, including the configuration of the output signals used for alarms and pulse output. An external termination box is attached for easy hookup of these signals. The alarms are configurable as normally open or normally closed.

The alarm contact and pulse output digital signals are electrically identical, independent, optically coupled transistor outputs. Wiring will be as required by the external driven system— Prover, DCS/PLC, terminal-automation system, batch controller etc. These can be wired as an open collector or open emitter signal on the high or low side of voltage-rail within the receiving equipment, depending upon the signal needs. When interfacing to external electronics, be careful to work within the voltage/current polarity and limits as specified in Section 1.

To install the typical transmitter alarms and/or pulse digital outputs configuration:

1. Intrinsically safe installations require the use of barriers, power supply limits and cable parameters as shown in the installation diagram. All connections are made in the terminal box attached to the back of the transmitter housing. Refer to Figures 1-4 and 1-8.
2. If the area classification is Division 2, a barriers are not required and cable parameters are not applicable. However, the electrical code will require the use of conduit for wire protection. Refer to Figures 1-4 and 1-8.
3. If the installation is to be protected by Division 1 explosion proof methods, the optional explosion proof enclosure is required and explosion proof installation methods must be followed. Refer to Figures 1-5 and 1-8.
4. It is highly recommended that shielded cable be used for hook up. The shield should be connected to chassis ground at the transmitter end and should be taped up and not connected at the receiver end. Insulation of the shield at the receiving end is especially important for intrinsically safe installations.
5. The maximum resistance of the loop resistor, the associated cable and the barrier is determined by the power supply voltage and is shown graphically in Figure 1-2.
6. The pulse and alarm outputs function as isolated switch closures (optically isolated open collector-emitter) and must be supplied with a power source, as shown in wiring diagram, Figure 1-4. Observe polarity and do not exceed 30 Volts for the supply and limit load current to 20 mA for each output.
7. The zero function is activated by momentarily shorting the zero terminals on the wiring block. This may be accomplished with any conductive jumper or a switch which can be remotely mounted. The hazardous area classification will determine the wiring methods used for this switch.

8. After installation and powering of the loop, the transmitter must be zeroed, both electrically and mechanically. This operation will compensate for any stray magnetic effects in the vicinity of the transmitter. Flow must be zero and when the zero function is momentarily activated. The pointer must also be adjusted to the reference line on the scale using the adjustment screw on the face of the pointer, next to the hub. The zero function may be activated as part of a periodical maintenance check.
9. Under actual flow conditions, verify that the transmitter output matches the mechanical pointer position and that the alarms and pulse outputs are working properly. If a discrepancy is noted, the HART communications channel can be used to verify or adjust the transmitter settings. The Emerson Model 275 hand held communicator provides a simple means to accomplish this check anywhere in the loop. Refer to Figure 3-2 for connection instructions.

2-9 Installation of Models MT 3809 and MT 3819 Flowmeters with a Smart Meter Manager Transmitter with Inductive Alarms (1 or 2 Switches)

a. Install the meter as described in Section 2-7.
b. Install the transmitter as described in Section 2-8.
c. Install the inductive alarms as indicated below Section 2-10.

2-10 Installation of Models MT 3809 and MT 3819 Flowmeters with Inductive Alarms (1 or 2 Switches)

⚠ CAUTION

Since this is a magnetically activated device, strong magnetic fields and materials with magnetic properties may cause faulty operation when in close proximity to the flowmeter. This includes steel pipes, steel conduit, motors, and transformers.

⚠ CAUTION

Flowmeters with a transmitter must be mounted at least 18 inches apart to prevent the interaction of adjacent float magnets and transmitter.

⚠ WARNING

To prevent ignition of hazardous atmospheres and serious personal injury, proper installation methods must be used as defined in Article 505 of the National Electrical Code and the Canadian Electrical Code and ISA Stnadard 12.6.

Install the meter as described in Section 2-7.

To install the inductive alarms (1 or 2 switches):

1. The inductive alarms can be supplied as a stand alone option or combined with the transmitter. When stand alone, connections to the alarms are made inside the indicator housing. When supplied in combination with the transmitter, connections are made inside the auxiliary terminal box attached to the indicator housing.
   Refer to Fig. 1-7 for stand alone inductive alarm installation and to Figures 1-6 and 1-8 for installation with the transmitter combined with the inductive alarms.
2. Intrinsically safe installations require the use of relay isolators for the alarms and a barrier for the transmitter, if equipped. Power supply limits and cable parameters must be as shown in the installation diagram.
3. If the area classification is Division 2, the transmitter barrier and cable parameters are not applicable. However for proper operation of the inductive alarms, the relay isolators must be used. The electrical code will require the use of conduit for wire protection.
4. If the installation is according to Division 1 explosion proof methods, the optional explosion proof enclosure is required and explosion proof installation methods must be followed. For proper operation of the inductive switches, the relay isolators must be used.
5. It is highly recommended that shielded cable be used for hook up. The shields should be connected to chassis ground at the transmitter/alarm end and should be taped up and not connected at the receiver end. The taping and insulation of the shields at the receiving end is especially important for intrinsically safe installations.
6. For the transmitter output, if supplied, the maximum resistance of the loop resistor, the associated cable and the barrier is determined by the power supply voltage and is shown graphically in Figure 1-2.
7. The relay isolator has built in power handling contacts. Refer to the specifications for these ratings.
8. If desired, the transmitter zero function can be remotely mounted using a momentary contact switch. Follow the same wiring practices as used for the other outputs.
9. After installation and powering of the loop, the transmitter must be zeroed, both electrically and mechanically. This operation will compensate for any stray magnetic effects in the vicinity of the transmitter. Flow must be zero when the zero function is activated, using the remote switch or shorting the zero terminals. The pointer must also be adjusted to the reference line on the scale using the adjustment screw on the face of the pointer, next to the hub. The zero function may be activated as part of a periodical maintenance check.
10. Under actual flow conditions, verify that the transmitter output matches the mechanical pointer position. If a discrepancy is noted with the transmitter, the HART communications channel can be used to verify or adjust the transmitter settings. The Emerson Model 275 hand-held communicator provides a simple means to accomplish this check anywhere in the loop. Refer to Figure 3-2 for connection instructions.
11. Proper operation of the inductive alarms can be determined by manually rotating the mechanical pointer and observing the status lights on the relay isolator. The small alarm pointers indicate the alarm trip points. Changes to the set points can be made by loosening the pointer screws and repositioning the pointers.

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3-1 Pre-Start Check

After the flowmeter has been properly installed in the process, it is ready for operation. When initiating flow, slowly open the valve to avoid a flow surge.Bypass is a help in bringing the flow on smoothly. Avoid starting a pump to supply the flowmeter without the use of a valve upstream of the flowmeter

⚠ WARNING

Operating Procedure: Do not operate this instrument outside the specifications listed in Section 1. Before bringing the unit into operation, make sure that all fluid connections have been correctly tightened and that all electrical connections where applicable have been made.

⚠ WARNING

Do not operate this instrument in excess of the specifications listed in Section 1-3. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

At no flow condition the indicator pointer should align with the “0” mark on the scale. If necessary, adjust the pointer as per directions in the Maintenance Section 4-3.

3-2 Start-Up and Operation of Flowmeter

a. Slowly initiate flow into the system. Open process valves slowly to avoid flow surges.
b. Check for leaks around the meter inlet and outlet connections. If no leaks are present, bring the system up to operating pressure.

3-3 Operation of the Models MT 3809 and MT 3819 Flowmeters with a Smart Meter Manager Transmitter with or without Optional Alarms and Pulse Output for totalization

a. Start-up the meter as described in Section 3-2.
b. Programming performed prior to shipment (parameters)
The SMM transmitter with or without alarms and pulse output is preprogrammed prior to shipment for the following parameters based on the order information, meter configuration and application.
If parameters are not specified in the customer purchase order, the defaults inherent to the electronics will be as shown in (parenthesis).

Transmitter Only (uP) Pre-Programmed Parameters	**Transmitter (uP) Plus... Alarms and Pulse Output Preprogrammed Parameters**
Model Number	Alarm LoLimit (0% FS flow)
Serial Number	Alarm HiLimit (100% FS flow)
Tag Name (blank)	Pulse output units (1 ppg)
Flow Rate units of measure (gpm)	Resettable totalizer units of measure (gal.)
Low Flow cutoff (10% FS flow)	Inventory totalizer units of measurement (gal.)
Calibration factor (% scales only)	
Analog Output LoRange (4 mA @ 0% flow)	
Analog Output HiRange (20 mA @ 100% flow)	

c. Manual Programming or Reprogramming of the SMM electronics
If electronic parameters were not preprogrammed prior to shipment or new settings are required, programming of the SMM transmitter with or without alarms and pulse output may also be done locally via an Emerson Model 275 hand held Communicator. Refer to Figures 3-1 and 3-2 for Device Description Basic Setup and Detailed Device Description Setup Trees.generate an electrical signal directly proportional to the gas mass flow rate.

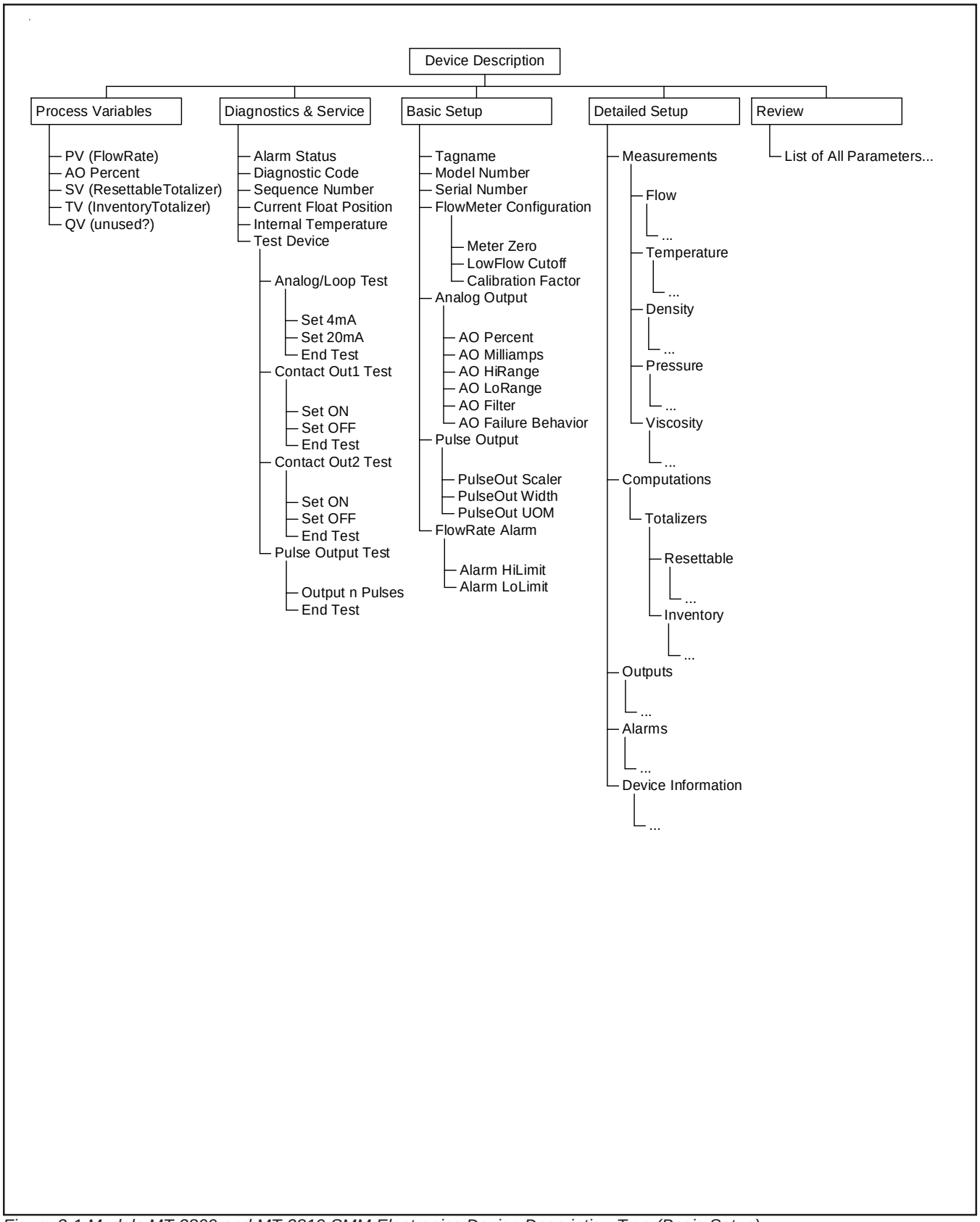


Figure 3-1 Models MT 3809 and MT 3819 SMM Electronics Device Description Tree (Basic Setup)

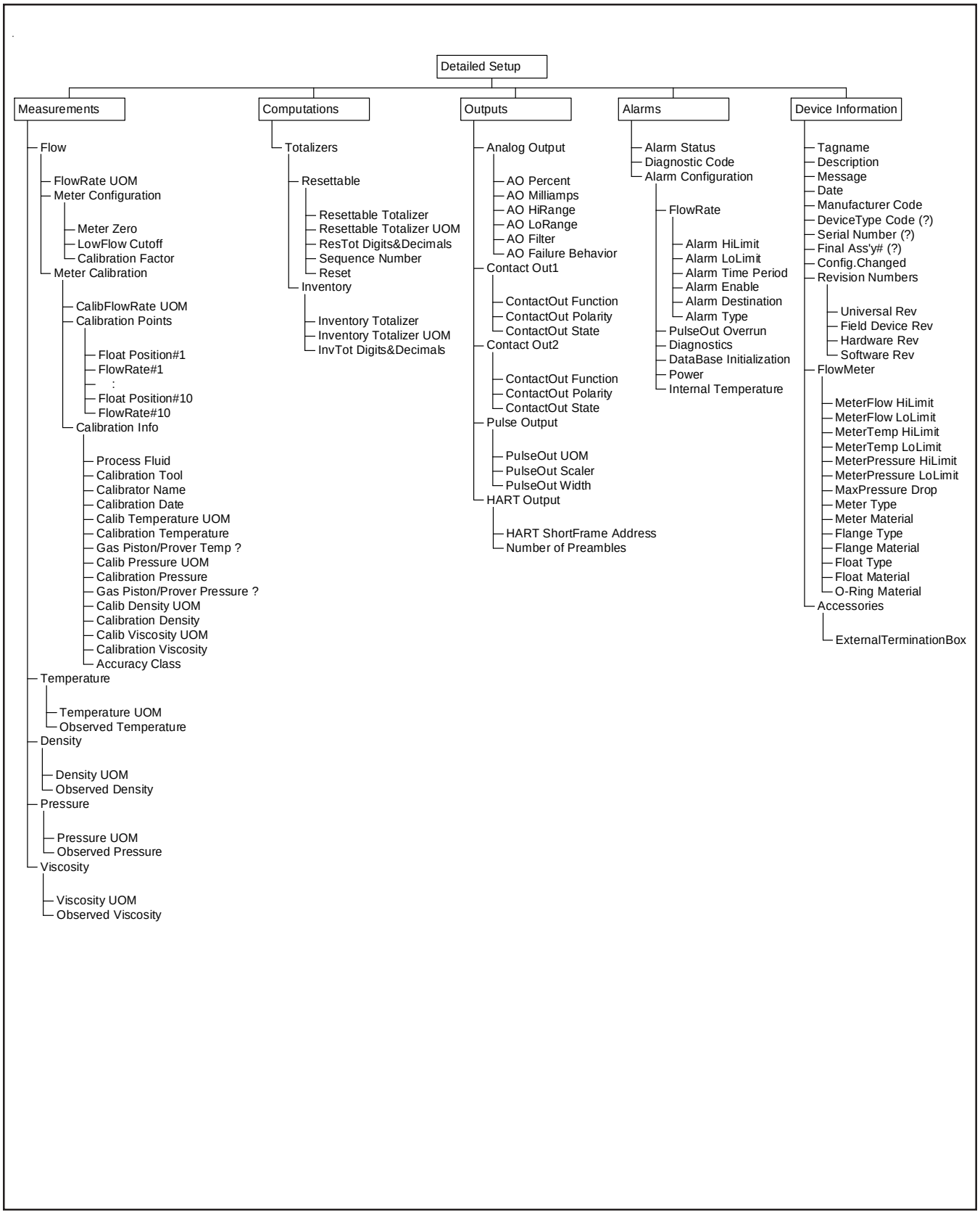


Figure 3-2 Models MT 3809 and MT 3819 SMM Electronics Device Description Tree (Detailed Setup)

The HART Communicator is the hand-held interface that provides a common communication link to all HART compatible, microprocessor-based devices. A keypad, liquid crystal display (LCD) and software menu structure make up the HART communicator user interface. The Emerson Model 275 is easy to use. Just press a few buttons to become familiar with the Action Keys and menu structure.

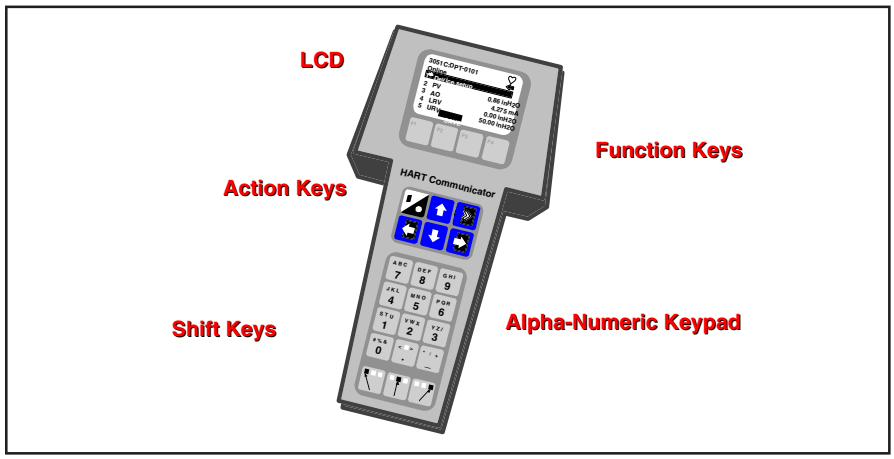


Figure 3-3 HART Communicator

Typical Connection Emerson Model 275 Communicator Interface
The HART Communicator interfaces with any HART instrument from any wiring termination point in a 4-20 mA loop, provided a minimum load resistance of 250 ohms is present between the HART Communicator and power supply. A minimum load resistance of 250 ohms must be present between the HART Communicator and power supply in order for the HART Communicator to communicate with any HART compatible instrument. (An optional rugged 250 ohm resistor that attaches to the lead set is available from Emerson. The resistor must be installed in series, **not** in parallel.)

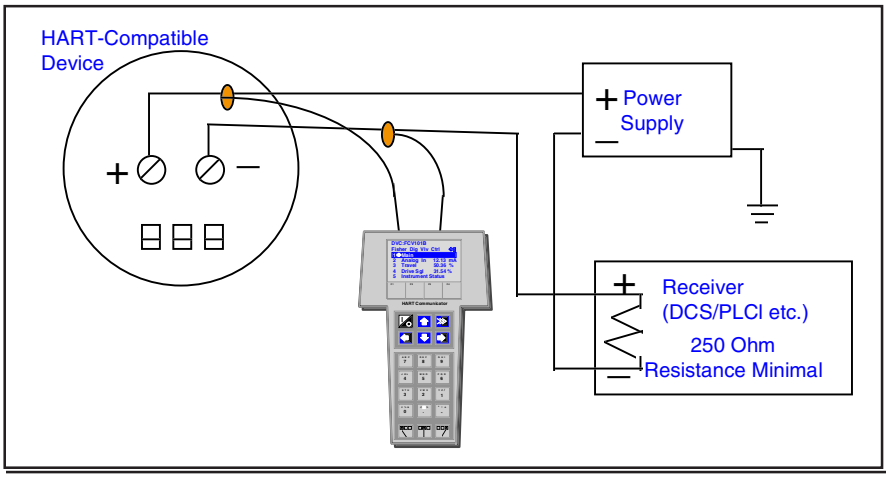


Figure 3-4 Typical HART Communicator Interface

Emerson Model 275 Communicator Functions

Action Keys and Hot Key

Six Action Keys promote easy navigation through the menu structure. You may customize the Hot Key to quickly access a menu of your most frequently performed on-line tasks. The Hot Key Menu is a user-definable menu containing one permanent option, Range Values. Range Values provides quick access to rearrange capability. Up to 19 frequently performed tasks can also be added to this menu. These tasks are stored even when the communicator is off, and are always readily available by simply pressing the Hot Key.

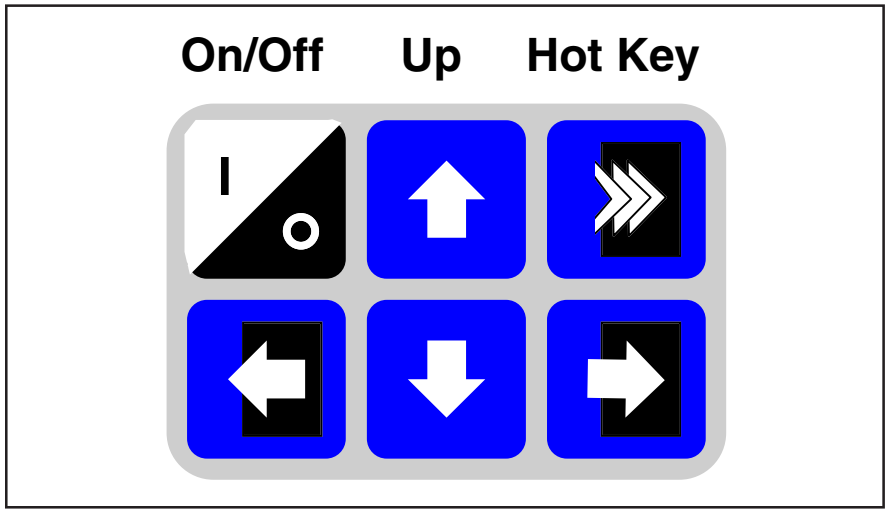


Figure 3-5 HART Communicator Action / Hot Keys

LCD

The LCD is an eight-line by twenty-one character display that provides a window to all the functions of a HART compatible device. When connected to a HART compatible device, the top line of each menu displays the model name of the device and its tag. The bottom line of each menu is reserved for a dynamic label for each function key, F1 through F4.

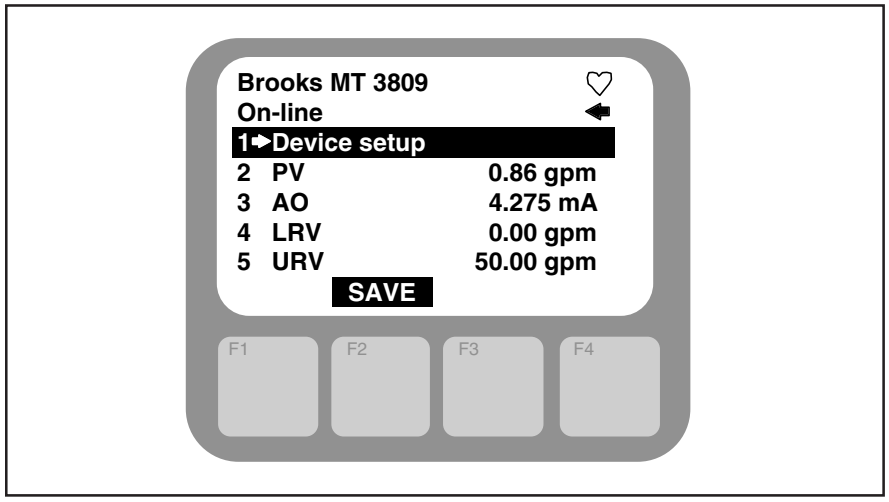


Figure 3-6 HART LCD

Function Keys
Use the four function keys, marked F1 through F4 located below the LCD to perform software functions as indicated by the dynamic labels. Different labels appear over the four function keys as you move among the various menus.

On-line Menu
When connected to a HART compatible device, simply press the ON Key to display the On-line Menu. This menu contains the most critical information about the connected device and your measurement including:

- Model Number
- User-defined Tag Number
- Flow Rate Units of Measure
- Analog Output LoRange
- Analog Output HiRange

a. Simulation Mode

The HART Communicator provides a mode that allows you to simulate an on-line connection to a specific HART compatible device. The simulation mode is a training tool that enables you to become familiar with a device before configuring it in a critical environment. Access to the simulation mode is through the utility menu.

For more details and instructions on use of the Emerson Model 275 Communicator please contact Brooks Service Department Representative or your local Emerson office.

b. Recalibration of Analog Transmitter Output (spanning high and low)

At any time after factory calibration, shipment, installation, or service, the SMM transmitter can be recalibrated by overwriting any of the previous calibration point-pairs, assuming that the user can provide a series of accurate rates of flow through the meter. If preferred, the meter with transmitter may be returned for recalibration at the Brooks Service Department for a fee.

c. Basic Transmitter Setup Parameters

Refer to Figures 3-1 and 3-2. These are meter identification parameters set prior to shipment of the meter.

Flowmeter Identification: Model Number, Serial Number, Tag Name

Flowmeter Configuration: Low Flow Cutoff, Calibration Factor, Flow Rate Units of Measure

Transmitter Analog Output: Analog Output HiRange, Analog Output LoRange

d. Optional Programmable Alarm and Pulse Output Parameters and Features

Alarm Contact Output: HiLimit, LoLimit

One or two digital outputs are available for a alarm signals. Contact output polarity is configurable as Normally Open (N.O.) or Normally Closed (N.C.). The alarms may be set at the minimum and maximum flow rate or at any other preferred high and low limits. The units of measure of the alarm limits is the same units of measure as the process variable itself.

Computations: Totalization

Totalizers are available in both Resettable and Inventory options. Resettable totalization is used for batching while inventory totalization measures the total volume over time. Units of measure are set independently for each of these options.

Pulse Output: Pulse Out Scaler, Pulse Out Width

The SMM has a pulse output channel that indicates flow rate as a variable frequency and therefore can pass information to many types of external equipment such as batch controllers, automation systems or provers. The output pulse width default is 1 millisec but may be user-configured since certain external receiving equipment cannot keep up with high incoming frequency.

Low Flow Cutoff Warning for Pulse Output and Totalization

The low flow cutoff parameter can be programmed to signal when the flow level is below which the process is intended. Below this level, the totalizer will assume that the flow rate is actually zero and that no data should be accumulated by the totalizers.

Pulse Output Overrun Alarm

If a larger than acceptable output pulse width is configured, totalizer pulses may be delayed or queued. No loss of pulses will occur. The totalizer output pulses will to be sent until the queue is empty. Under these circumstances, an alarm message will be sent to the control station. However, the alarm can be disabled if not required.

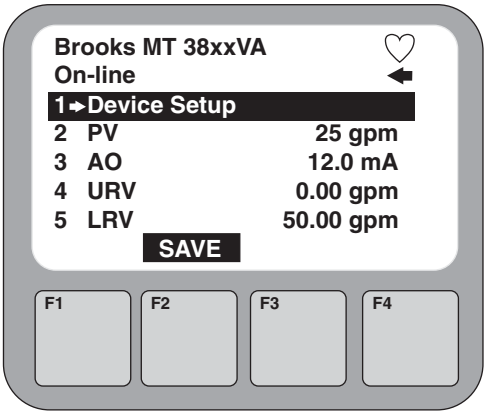
Optional Alarm Configurations— Enable, Destination, Alarm Type (Latching)

Three additional parameters may be programmed for process and diagnostic alarms to control functionality — enable, destination, and alarm type (latching). ‘Enable’ allows alarms to be enabled and disabled depending on use of the alarm. For example, if output pulses are being used it may be normal practice to delay (e.g. queue up) output pulses because of a slow receiving end-device that requires a wide pulse-width. The ‘enable’ parameter allows the user to *disable* the pulse output overrun alarm and not send an alarm when in fact pulse outputs are delayed by choice. Some critical diagnostic alarms, such as database initialization, can

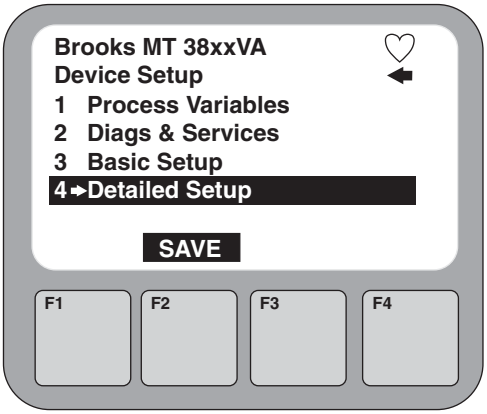
not be disabled or turned off.
When an alarm occurs, it can be posted through the defined ‘destination’ digital contact closure outputs #1, #2 both or neither. Therefore the alarms may be managed according to local operating practices and the need to notify upstream control/safety systems.

An alarm may be posted at a designated destination only when the alarm situation is occurring or posted until the alarm is acknowledged by the operator. The decision to ‘latch or unlatch’ the alarm is controlled by setting the ‘alarm type’ parameter. By utilizing this optional parameter, the operator can see that there is an alarm as it is occurring (unlatched) or even after the fact, in the case when the operator did not directly observe the unit alarm (latched).
The following are two examples of typical programming via an Emerson Model 275 hand-held communicator.

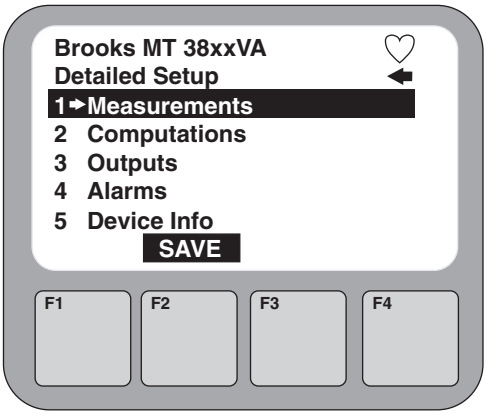
Example 1: Programming Flow Rate Units.



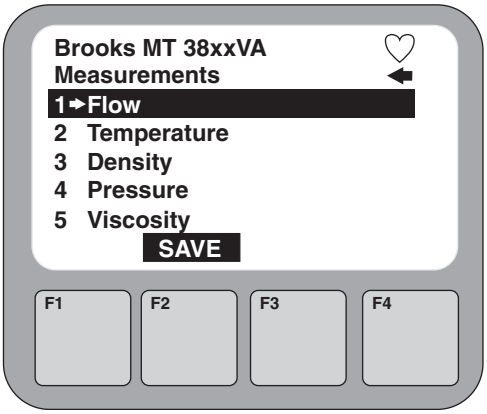
From the Online Menu, select *Device Setup*.



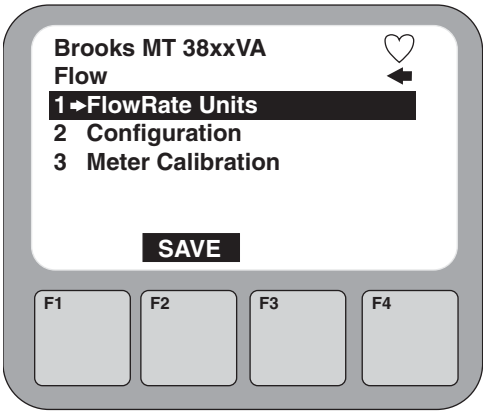
From the Device Setup Menu, select *Detailed Setup*.



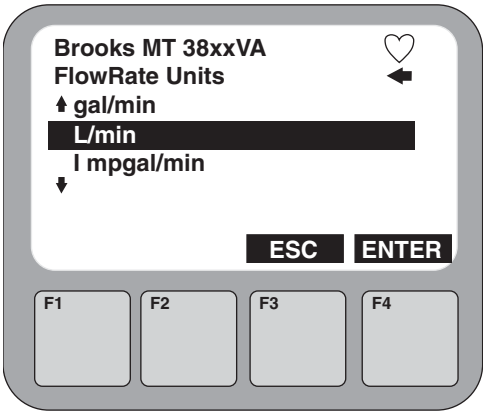
From the Detailed Setup Menu, select *Measurements*.



From the Measurements Menu, select *Flow*.



From the Flow Menu, select *FlowRate Units of Measure* (FlowRate UOM).



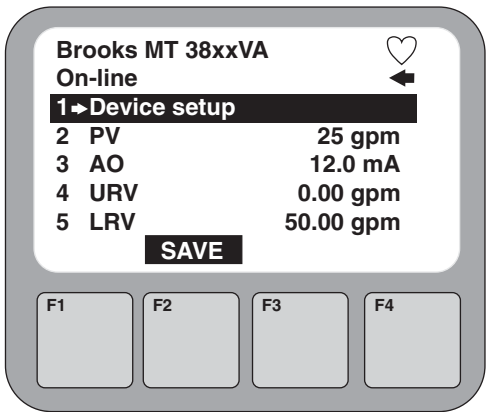
In Flow, scroll through list optional units. Highlight the FlowRate UOM desired. Press **ENTER** (F4) to enter the new information, and press **SEND** (F2) to send this information to the transmitter.

Note: Two Warning messages will appear.

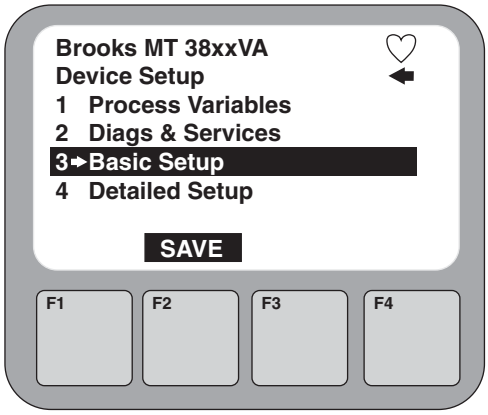
- Warning Pressing OK will change device output. Put loop in manual.
- Warning Return control loop to automatic control.

These warnings confirm changes to the programming and alert the user to make changes in other related fields.

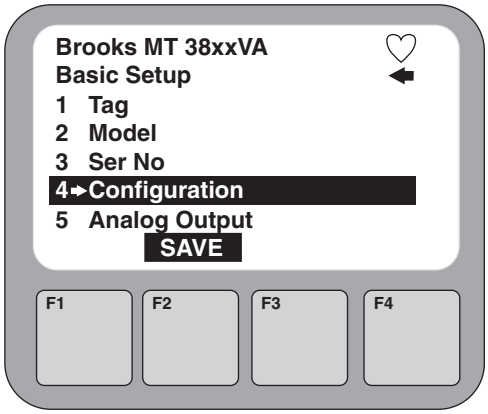
Example 2: Programming Low Flow Cutoff.



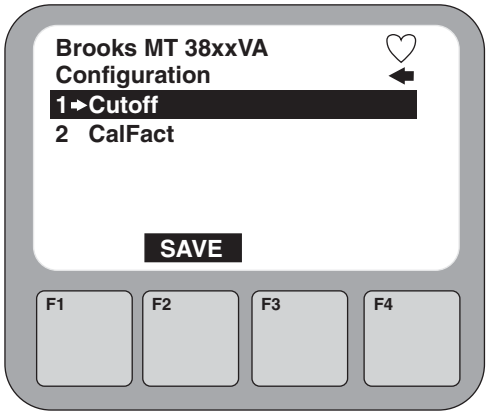
From the Online Menu, select *Device Setup*.



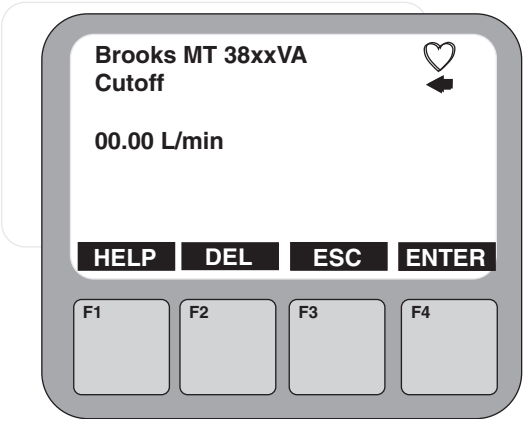
From the Device Setup Menu, select *Basic Setup*.



From the Basic Setup Menu, select *Configuration*.



From the Configuration Menu, select *Cutoff*.



Enter the Cutoff value in the same units specified in the FlowRate UOM. Press **ENTER** (F4) to enter the new information and press **SEND** (F2) to send this information to the transmitter.

3-4 Operation of the Models MT 3809 and MT 3819 Flowmeters with a Smart Meter Manager Transmitter with Inductive Alarms (1 or 2 Switches)

a. Start-up the meter as described in Section 3-2.
b. Start-up the transmitter as described in Section 3-3.
c. Start-up the inductive alarms as described in Section 3-5.

3-5 Operation of the Models MT 3809 and MT 3819 Flowmeters with Inductive Alarms (1 or 2 Switches)

a. Start-up the meter as described in Section 3-2.
b. To modify the alarm set points, remove the front cover with gasket of the indicator housing by removing the four screws.
c. Set the alarm position by loosening the two pointer screws, moving the pointer to the desired alarm setting and tightening the screws.
d. Replace the indicator housing cover with gasket and secure with the four screws.

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4-1 General Service Information

⚠ WARNING

METER/CONTROLLER SEAL COMPATIBILITY

Products in this manual may contain metal or elastomeric seals, gaskets, O-rings or valve seats. It is the "user's" responsibility to select materials that are compatible with their process and process conditions. Using materials that are not compatible with the process or process conditions could result in the Meter or Controller leaking process fluid outside the pressure boundary of the device, resulting in personnel injury or death.

It is recommended that the user check the Meter or Controller on a regular schedule to ensure that it is leak free as both metal and elastomeric seals, gaskets, O-rings and valve seats may change with age, exposure to process fluid, temperature, and /or pressure.

⚠ WARNING

If it becomes necessary to remove the instrument from the system power to the device is disconnected at the power supply.

⚠ WARNING

If it becomes necessary to remove the flowmeter from the system after exposure to toxic, pyrophoric, flammable or corrosive gas, purge the flowmeter thoroughly with a dry inert gas such as Nitrogen before disconnecting the gas connections. Failure to correctly purge the flowmeter could result in fire, explosion or death. Corrosion or contamination of the flowmeter upon exposure to air, may also occur.

⚠ CAUTION

It is important that this device only be serviced by properly trained and qualified personnel.

⚠ WARNING

If this equipment is not properly serviced, serious personal injury and/or damage to the equipment can result from potentially high operating pressures. Process line pressure should be removed prior to servicing.

There is no routine maintenance required for the Models MT 3809 and MT 3819 flowmeters. However should it become necessary to replace, adjust or remove components of the flowmeter, specific recommendations must be followed.

4-2a Meter Float Replacement and Cleaning (MT 3809)

Float replacement procedures are dependent on the meter size, connection type and fluid (gas vs. liquid) application. Please refer to the appropriate section below for instructions along with Figures 4-1, 4-2 and 4-3 for referenced part numbers (#) appearing in parenthesis.

⚠ WARNING

Pressure test the meter before returning it to service. Hydrostatic pressure testing should be performed only by qualified personnel or serious personal injury and/or damage to the equipment can result.

1. Flanged Connection

a. Size 7 (1/2") Flanged Liquid or Gas Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. With a small screwdriver, remove the spiral retaining ring (#1) from the meter inlet.
3. Push the entire float assembly slowly downward and out of the meter inlet by pushing from the top with a round bar stock (3/4" or 19 mm diameter).
4. Remove the float snap-ring to clean individual float assembly parts.
5. Reassemble the meter by reassembling the float assembly and inserting it into the bottom of the meter. Replace the spiral retaining ring (#1) in the meter inlet.

b. Size 8 (1/2") Flanged Liquid Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. With small screwdriver remove the spiral retaining ring (#1) from the

meter inlet.

3. Loosen the float assembly with two screwdrivers one on each end of the meter and turn to loosen the inlet and outlet screws (#2). Remove inlet screw (#2) at the bottom of the meter.
4. Remove the guide vane (#3) at the bottom of the meter and gently push the float assembly up and out the top/outlet side.
5. Reassemble by inserting the float assembly into the top of the meter. Replace the guide vane (#3) and secure the float assembly by tightening the inlet and outlet screws (#2). Replace the spiral retaining ring (#1) in the meter inlet.

c. Size 8 (1/2") Flanged Gas Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. With the help of a small screwdriver remove the spiral retaining ring (#1) from the meter inlet.
3. Secure the damper from turning by inserting a 1/8” pin through the top guide cartridge. While holding the damper in place, remove the top/ outlet screw (#5).
4. Push the float assembly out through the inlet/bottom.
5. To clean the gas damper, unscrew the cylinder head (#6). Then remove the bolt (#7) and carefully take out the small piston so as to not damage the critical surfaces.
6. Reassemble the meter by assembling the damper with float assembly. Insert the float assembly with damper into the inlet/bottom of the meter. Secure the inlet/bottom screw. While holding the damper in place with a pin (1/8” diameter), insert and secure the top/outlet screw (#5). Replace the spiral retaining ring (#1).

d. Sizes 10 (1"), 12 (1 1/2"), 13 (2") Flanged Liquid Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Loosen the float assembly with two screwdrivers one on each end of the meter and turn to loosen the inlet and outlet screws (#2).
3. Remove inlet screw (#2) at the bottom of the meter.
4. Remove the guide vane (#3) at the bottom of the meter and gently push the float assembly up and out the top/outlet side.
5. Reassemble by inserting the float assembly into the top of the meter. Replace the guide vane (#3) and secure the float assembly by tightening the inlet and outlet screws (#2).

e. Sizes 10 (1"), 12 (1 1/2"), 13 (2") Flanged Gas Service

1. With the help of a small screwdriver remove the spiral retaining ring (# 1) from the meter inlet.
2. Secure the damper from turning by inserting a 1/8” pin through the top guide cartridge. While holding the damper in place, remove the top/

outlet screw (#5).

3. Push the float assembly out through the inlet/bottom.
4. To clean the gas damper, unscrew the cylinder head (#6). Then remove the bolt (#7) and carefully take out the small piston so as to not damage the critical surfaces.
5. Reassemble the meter by assembling the damper with float assembly. Insert the float assembly with damper into the inlet/bottom of the meter. Secure the inlet/bottom screw. While holding the damper in place with a pin (1/8” diameter), insert and secure the top/outlet screw (#5). Replace the spiral retaining ring (#1).

f. Sizes 15 and 16 (3" and 4") Flanged Liquid or Gas Service (Size 15 only)

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Loosen the float assembly by fixating two pliers one on each end of the float assembly inlet guide cartridge (#8). Turn to loosen with the help of a pin wrench.
3. Carefully remove the complete float assembly (#2) and conical taper (#7) as well as the spacer bushing (#10, Size 16 only) out the inlet/ bottom of the meter.
4. Reassemble by inserting the float assembly inside the conical taper (as well as the spacer bushing, Size 16 only). Then insert the complete float assembly into the bottom of the meter. Replace the float assembly inlet guide cartridge and tighten the float assembly into place.

2. NPT Connection

a. Size 7 (1/2") NPT Liquid or Gas Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Unscrew the inlet fitting (#4) at the bottom of the meter.
3. Push the entire float assembly slowly downward and out of the meter inlet by pushing from the top with a round bar stock (3/4” or 19 mm diameter).
4. Remove the float snap-ring and clean individual float assembly parts.
5. Reassemble the meter by reassembling the float assembly and inserting it into the bottom of the meter. Reinstall and secure the inlet fitting (#4).

b. Sizes 8 (1/2"), 10 (1"), 12 (1 1/2"), 13 (2") NPT Liquid Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Unscrew the inlet fitting (#4) at the bottom of the meter.
3. Loosen the float assembly with two screwdrivers one on each end of the meter and turn to loosen the inlet and outlet screws (#2). Remove inlet screw (#2) at the bottom of the meter.
4. Remove the guide vane (#3) at the bottom of the meter and gently push

the float assembly up and out the top/outlet side.

5. Reassemble by inserting the float assembly into the top of the meter. Replace the guide vane (#3) and secure the float assembly by tightening the inlet and outlet screws (#2). Reinstall and secure the inlet fitting (#4).

c. Size 8 (1/2") NPT Gas Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Unscrew the outlet fitting (#4) at the top/outlet of the meter and remove the gas damper.
3. Unscrew the inlet/bottom fitting (#4) and slowly remove the float assembly.
4. To reassemble the meter, insert the float assembly into the inlet/bottom of the meter. Secure the inlet/bottom fitting (#4). Replace the gas damper and secure the outlet/top fitting (#4).

d. Sizes 10 (1"), 12 (1 1/2"), 13 (2") NPT Gas Service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Remove the top/outlet screw (#5).
3. Loosen the float assembly by holding the damper in place with a pin (1/8" diameter) in the top while loosening the inlet/bottom fitting. Gently push the float assembly out through the inlet/bottom.
4. To clean the gas damper, unscrew the cylinder head (#6). Then remove the bolt (#7) and take out the small piston carefully so as to not damage the critical surfaces.
5. Reassemble the meter by inserting the float assembly with damper into the inlet/bottom of the meter. Secure the inlet/bottom screw by holding

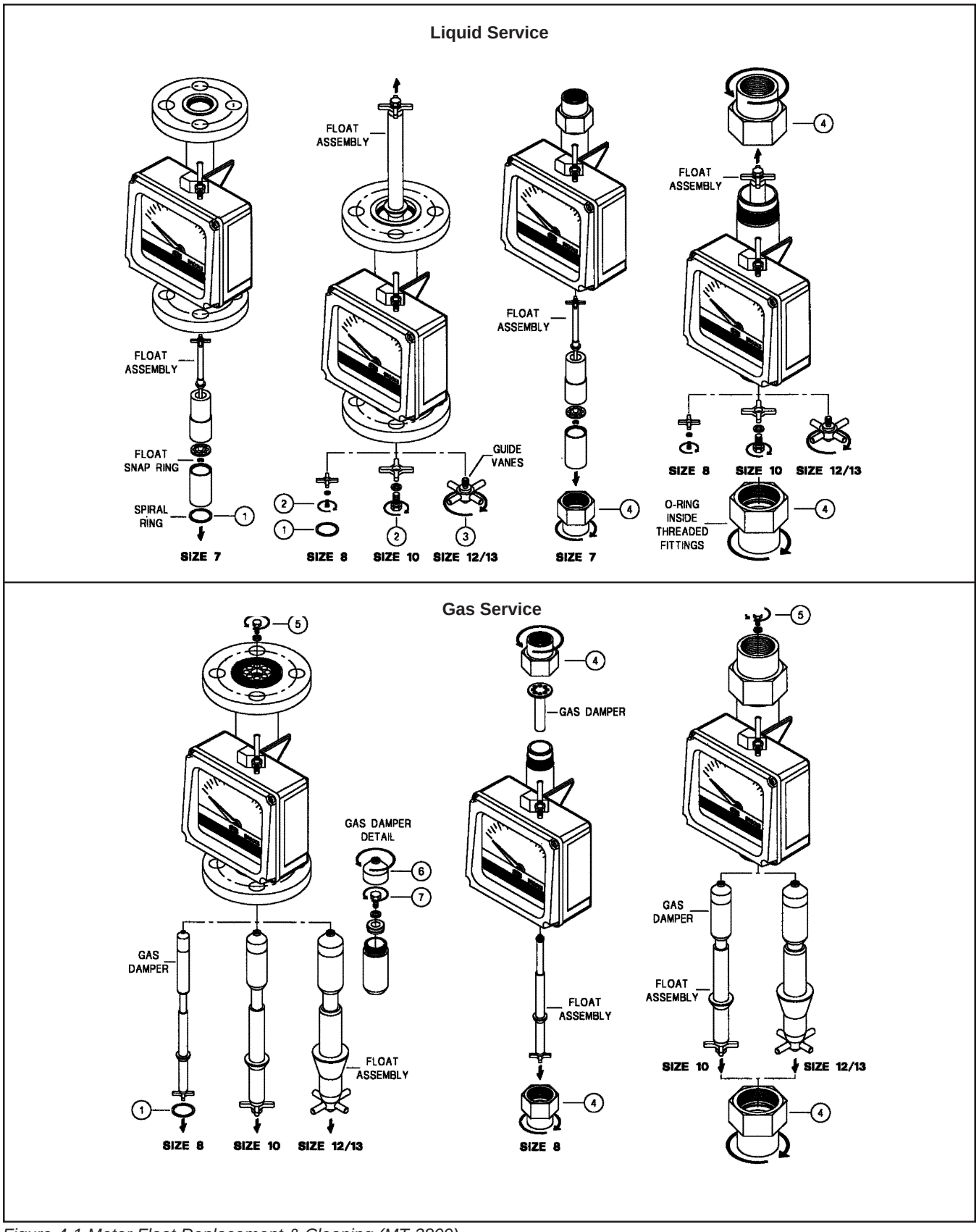

Figure 4-1 Meter Float Replacement & Cleaning (MT 3809)

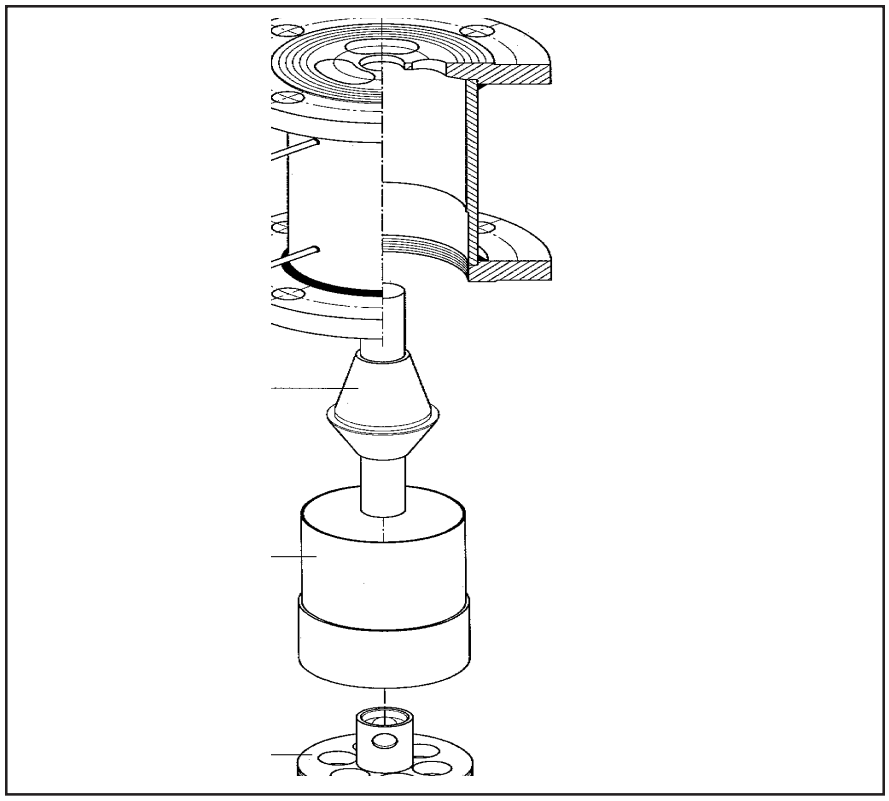

Figure 4-2 Exploded View, Model MT 3809, Size 15 (Gas or Liquid Service Only)

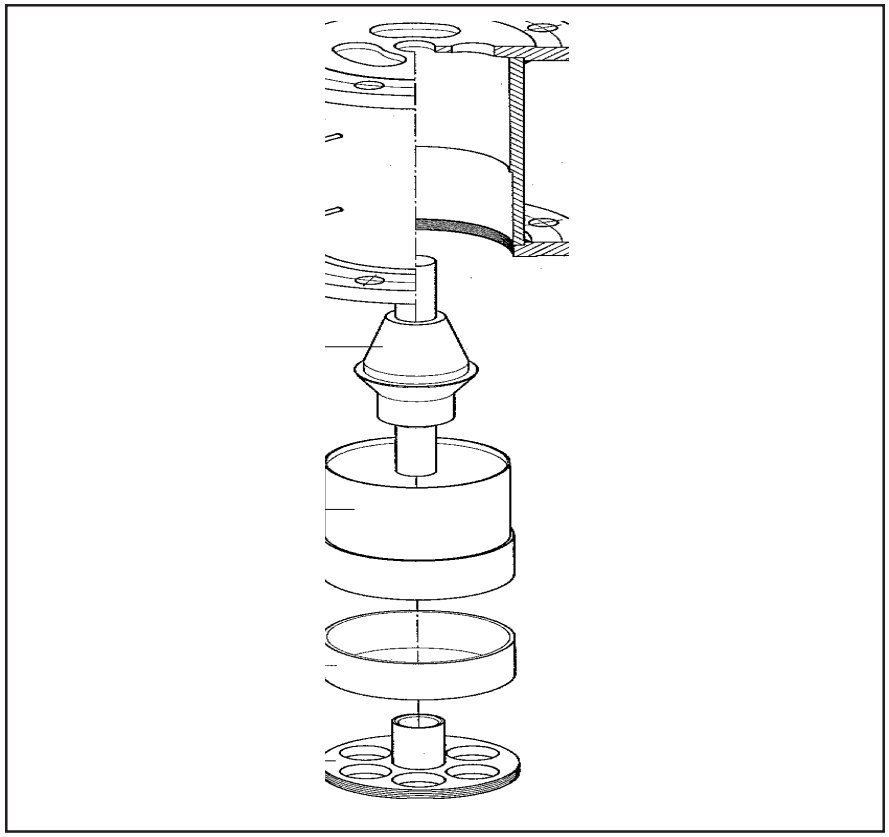

Figure 4-3 Exploded View, Model MT 3809, Size 16 (Liquid Service Only)

4-2b Meter Float Replacement and Cleaning (MT 3819)

Flanged Connections, All Sizes, Liquid or Gas

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. With a screwdriver, carefully loosen the inlet and outlet inserts (#3, #5).
3. Continue to pull until the inlet and outlet inserts are removed from the meter.
4. Remove the float (#4) and tapered insert (#2) from the meter.
5. Reassemble by reinserting the float (#4) and tapered insert (#2). And then gently push the inlet and outlet inserts (#3, #5) into the flanges. Sizes 10 (1"), 12 (1-1/2") and 13 (2") meters, be careful to line up the top of the float assembly shaft with the outlet insert to ensure proper fit.

4-3 Meter Indicator Reference Mark (Zero) Adjustment

This adjustment is performed with no process flow with the float resting on the guide vane or the inlet end fitting.

a. Completely stop fluid flow through the indicator.
b. Remove the four screws securing the indicator housing window and remove the gasket and cover.
c. Turn the slotted screw on the bottom of the point until the pointer is in line with the reference (zero) mark on the scale.
d. Replace the indicator housing cover with gasket and secure with the four screws.

4-4 Smart Meter Manager Transmitter Replacement with or without Alarms and Pulse Output

The transmitter is a self contained unit matched specifically to the associated flowmeter. If there is a need to replace, please contact your nearest authorized Brooks Service Representative.

4-5 Inductive Alarm Replacement

a. Remove the front cover of the indicator housing by removing the four screws securing it.
b. The wires from the alarm switch(es) are plugged into the alarm terminal circuit board and must be unplugged for replacement.
c. Loosen the two screws securing the scale, with the alarm switches attached, and remove the scale.
d. Turn the scale over and locate the screw centered in the green alarm switch. Remove the screw being careful not to lose the nut on the outside of the alarm set bracket. Remove the alarm switch from

support.

e. Place the switch on the bracket with the open end facing towards the center of the scale plate and the wires facing away from the scale plate.

f. Place the switch screw through the opening in the switch, and the support bracket. Use the nut to secure the screw and tighten.

g. Plug in the switches.

h. Replace the scale and tighten two clamping screws. Make sure that the alarm switch wires do not interfere with the alarm cam. Insure that the pointer is aligned with the 'R' or zero mark. If not refer to Section 4-3, Indicator Reference Mark (Zero) Adjustment.

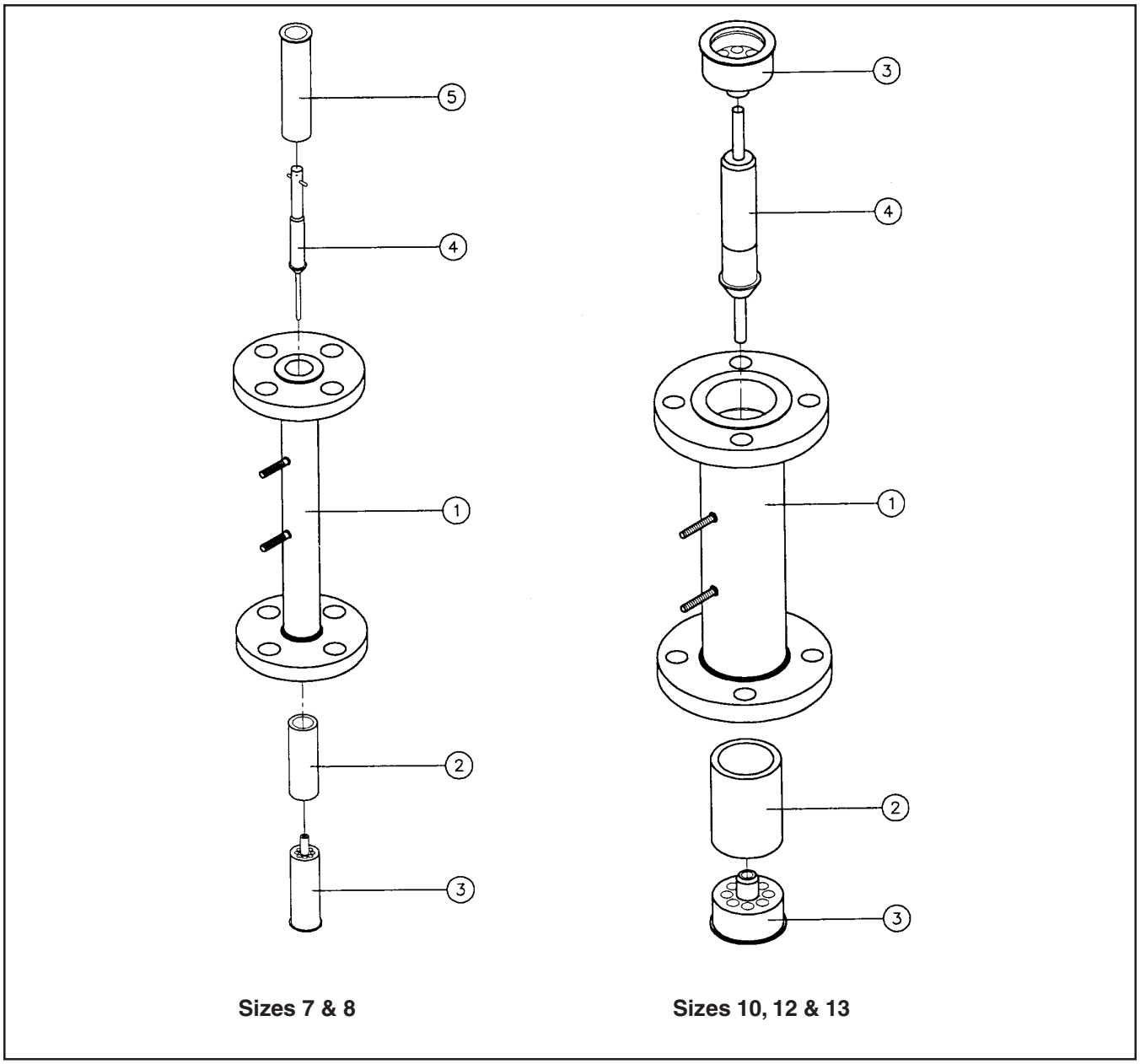

Figure 4-4 Meter Float Replacement & Cleaning (MT 3819)

i. Set the alarm position, by loosening the two pointer screws, moving the point of the desired alarm setting, and tightening the screws.

j. Connect the field wiring.

k. Replace the indicator housing cover and secure with four screws.

4-6 SMM Transmitter Replacement with Inductive Alarms

The transmitter is a self contained unit matched specifically to the associated flowmeter. If there is a need to replace it, please contact your nearest authorized Brooks Service Representative. However, the inductive alarms may be replaced according to the procedure in Section 4-5.

4-7 Monitoring the Integrity of the SMM Electronics - Diagnostic Alarms

As part of its normal operations, the SMM continuously monitors its own internal health. Automatic diagnostics can trigger alarms indicating poor communications, memory integrity, or sensor problems. The user can define whether these malfunctions are serious and instruct that a 4-20 mA analog-signal be sent automatically to a receiving devices such as a DCS or PLC system.

a. **Power Failure Alarm**
The power failure alarm will occur when the current-loop is broken and then restored. In this case, the transmitter will raise the power-fail alarm to notify the user that there was a gap in data collection. The 4-20 mA loop provides all internal power for the SMM electronics. However, if power is lost, the setup parameters are internally stored in nonvolatile memory (lithium battery) and maintained in the event that external power is disconnected.

b. **Database-Initialization Alarm** will occur when the transmitter powers up and finds that the internal parameter database was not saved properly and must return parameters to the inherent defaults.

c. **High Internal Temperature Alarm**
Should the electronics unit exceed functional limits (70°C), this information will be indicated.

TRADEMARKS
AMS ..... Emerson Process Management Grp. of Companies
Brooks ..... Brooks Instrument, LLC
Emerson ..... Emerson Electric Co.
Emerson Access Management ..... Emerson Electric Co.
HART ..... HART Communications Foundation
Smart Meter Manager ..... Brooks Instrument, LLC
SMM ..... Brooks Instrument, LLC
Teflon ..... E.I. DuPont de Nemours & Co.
Viton ..... DuPont Performance Elastomers

Dansk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Emne : Tillæg til instruktions manual.
Reference : CE mærkning af Masse Flow udstyr
Dato : Januar-1996.

Brooks Instrument har gennemført CE mærkning af elektronisk udstyr med succes, i henhold til regulativet om elektrisk støj (EMC direktivet 89/336/EEC).

Der skal dog gøres opmærksom på benyttelsen af signalkabler i forbindelse med CE mærkede udstyr.

Kvaliteten af signal kabler og stik:

Brooks lever kabler af høj kvalitet, der imødekommer specifikationerne til CE mærkning.

Hvis der anvendes andre kabel typer skal der benyttes et skærmet kabel med hel skærm med 100% dækning.

Forbindelses stikket type “D” eller “cirkulære”, skal være skærmet med metalhus og eventuelle PG-forskruninger skal enten være af metal eller metal skærmet.

Skærmen skal forbindes, i begge ender, til stikkets metalhus eller PG-forskruningen og have forbindelse over 360 grader.

Skærmen bør være forbundet til jord.

“Card Edge” stik er standard ikke af metal, der skal derfor ligeledes benyttes et skærmet kabel med hel skærm med 100% dækning.

Skærmen bør være forbundet til jord.

Forbindelse af stikket; venligst referer til vedlagte instruktions manual.

Med venlig hilsen,

Deutsch

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : Nachtrag zur Bedienungsanleitung.
Referenz : CE Zertifizierung für Massedurchflußgeräte
Datum : Januar-1996.

Nach erfolgreichen Tests enstprechend den Vorschiften der Elektromagnetischen Verträglichkeit (EMC Richtlinie 89/336/EEC) erhalten die Brooks-Geräte (elektrische/elektronische Komponenten) das CE-Zeichen.

Bei der Auswahl der Verbindungskabel für CE-zertifizierte Geräte sind spezielle Anforderungen zu beachten.

Qualität der Verbindungskabel, Anschlußstecker und der Kabeldurchführungen

Die hochwertigen Qualitätskabel von Brooks entsprechen der Spezifikation der CE-Zertifizierung.

Bei Verwendung eigener Verbindungskabel sollten Sie darauf achten, daß eine

100 %igenSchirmababdeckung des Kabels gewährleistet ist.

“D” oder “Rund” -Verbindungsstecker sollten eine Abschirmung aus Metall besitzen.

Wenn möglich, sollten Kabeldurchführungen mit Anschlußmöglichkeiten für die Kabelabschrimung verwendet werden.

Die Abschirmung des Kabels ist auf beiden Seiten des Steckers oder der Kabeldurchführungen über den vollen Umfang von 360 ° anzuschließen.

Die Abschirmung ist mit dem Erdpotential zu verbinden.

Platinen-Steckverbindunger sind standardmäßige keine metallgeschirmten Verbindungen. Um die Anforderungen der CE-Zertifizierung zu erfüllen, sind Kabel mit einer 100 %igen Schirmababdeckung zu verwenden.

Die Abschirmung ist mit dem Erdpotential zu verbinden.

Die Belegung der Anschlußpins können Sie dem beigelegten Bedienungshandbuch entnehmen.

English

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : Addendum to the Instruction Manual.
Reference : CE certification of Mass Flow Equipment
Date : January-1996.

The Brooks (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 89/336/EEC).

Special attention however is required when selecting the signal cable to be used with CE marked equipment.

Quality of the signal cable, cable glands and connectors:

Brooks supplies high quality cable(s) which meets the specifications for CE certification.

If you provide your own signal cable you should use a cable which is overall completely screened with a 100% shield.

“D” or “Circular” type connectors used should be shielded with a metal shield. If applicable, metal cable glands must be used providing cable screen clamping.

The cable screen should be connected to the metal shell or gland and shielded at both ends over 360 Degrees.

The shield should be terminated to a earth ground.

Card Edge Connectors are standard non-metallic. The cables used must be screened with 100% shield to comply with CE certification.

The shield should be terminated to a earth ground.

For pin configuration : Please refer to the enclosed Instruction Manual.

Español

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Asunto : Addendum al Manual de Instrucciones.
Referencia : Certificación CE de los Equipos de Caudal Másico
Fecha : Enero-1996.

Los equipos de Brooks (eléctricos/electrónicos) en relación con la marca CE han pasado satisfactoriamente las pruebas referentes a las regulaciones de Compatibilidad Electro magnética (EMC directiva 89/336/EEC).

Sin embargo se requiere una atención especial en el momento de seleccionar el cable de señal cuando se va a utilizar un equipo con marca CE

Calidad del cable de señal, prensaestopas y conectores:

Brooks suministra cable(s) de alta calidad, que cumple las especificaciones de la certificación CE .

Si usted adquiere su propio cable de señal, debería usar un cable que esté completamente protegido en su conjunto con un apantallamiento del 100%.

Cuando utilice conectores del tipo “D” ó “Circular” deberían estar protegidos con una pantalla metálica. Cuando sea posible, se deberán utilizar prensaestopas metálicos provistos de abrazadera para la pantalla del cable.

La pantalla del cable deberá ser conectada al casquillo metálico ó prensa y protegida en ambos extremos completamente en los 360 Grados.

La pantalla deberá conectarse a tierra.

Los conectores estandar de tipo tarjeta (Card Edge) no son metálicos, los cables utilizados deberán ser protegidos con un apantallamiento del 100% para cumplir con la certificación CE.

La pantalla deberá conectarse a tierra.

Para ver la configuración de los pines: Por favor, consultar Manual de Instrucciones adjunto.

Français

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Sujet : Annexe au Manuel d'Instructions.
Référence : Certification CE des Débitmètres Massiques à Effet Thermique.
Date : Janvier 1996.

Messieurs,

Les équipements Brooks (électriques/électroniques) portant le label CE ont été testés avec succès selon les règles de la Compatibilité Electromagnétique (directive CEM 89/336/EEC).

Cependant, la plus grande attention doit être apportée en ce qui concerne la sélection du câble utilisé pour véhiculer le signal d'un appareil portant le label CE.

Qualité du câble, des presse-étoupes et des connecteurs:

Brooks fournit des câbles de haute qualité répondant aux spécifications de la certification CE.

Si vous approvisionnez vous-même ce câble, vous devez utiliser un câble blindé à 100 %.

Les connecteurs « D » ou de type « circulaire » doivent être reliés à la terre.

Si des presse-étoupes sont nécessaires, ceux ci doivent être métalliques avec mise à la terre.

Le blindage doit être raccordé aux connecteurs métalliques ou aux presse-étoupes sur le pourtour complet du câble, et à chacune de ses extrémités.

Tous les blindages doivent être reliés à la terre.

Les connecteurs de type « card edge » sont non métalliques. Les câbles utilisés doivent être blindés à 100% pour satisfaire à la réglementation CE.

Tous les blindages doivent être reliés à la terre.

Se référer au manuel d'instruction pour le raccordement des contacts.

Greek

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Θέμα :Προσθήκη στο Εγχειρίδιο Οδηγιών.
Σχετικά :Πιστοποίηση CE των Οργάνων Μέτρησης Παροχής Μάζας.
Ημερομηνία :Ιανουάριος - 1996

Κυρίες και Κύριοι,

Τα όργανα (ηλεκτρικά/ηλεκτρονικά) της Brooks τα οποία φέρουν το σήμα CE έχουν επιτυχώς ελεγχθεί σύμφωνα με τους κανονισμούς της Ηλεκτρο-Μαγνητικής Συμβατότητας (EMC ντιρεκτίβα 89/336/EEC).
Οπωσδήποτε χρειάζεται ειδική προσοχή κατά τήν επιλογή του καλωδίου μεταφοράς του σήματος το οποίο (καλώδιο) πρόκειται να χρησιμοποιηθεί με όργανα που φέρουν το σήμα CE.

Ποιότητα του καλωδίου σήματος των στυπιοθλιπτών και των συνδέσμων .

Η Brooks κατά κανόνα προμηθεύει υψηλής ποιότητας καλώδια τα οποία πληρούν τις προδιαγραφές για πιστοποίηση CE.
Εάν η επιλογή του καλωδίου σήματος γίνει από σας πρέπει να χρησιμοποιήσετε καλώδιο το οποίο να φέρει εξωτερικά πλήρες πλέγμα και να παρέχει θωράκιση 100%.

Οι σύνδεσμοι τύπου "D" ή "Κυκλικοί" των καλωδίων, πρέπει να θωρακίζονται με μεταλλική θωράκιση. Εάν είναι εφαρμόσιμο, πρέπει να χρησιμοποιούνται μεταλλικοί στυπιοθλίπτες καλωδίων που να διαθέτουν ακροδέκτη σύνδεσης του πλέγματος του καλωδίου.
Το πλέγμα του καλωδίου πρέπει να συνδέεται στο μεταλλικό περίβλημα ή στον στυπιοθλίπτη και να θωρακίζεται και στα δύο άκρα κατά 360 μοίρες.
Η θωράκιση πρέπει να καταλήγει σε κάποιο ακροδέκτη γείωσης.

Οι σύνδεσμοι καρτών είναι μη-μεταλλικοί, τα καλώδια που χρησιμοποιούνται πρέπει να φέρουν πλέγμα θωράκισης 100% για να υπακούουν στην πιστοποίηση CE.
Η θωράκιση πρέπει να καταλήγει σε κάποιο ακροδέκτη γείωσης.

Για την διάταξη των ακροδεκτών: Παρακαλούμε αναφερθείτε στο εσώκλειστο Εγχειρίδιο Οδηγιών.

Italiano

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Oggetto : Addendum al manuale di istruzioni.
Riferimento : Certificazione CE dei misuratori termici di portata in massa
Data : Gennaio 1996.

Questa strumentazione (elettrica ed elettronica) prodotta da Brooks Instrument, soggetta a marcatura CE, ha superato con successo le prove richieste dalla direttiva per la Compatibilità Elettomagnetica (Direttiva EMC 89/336/EEC).

E' richiesta comunque una speciale attenzione nella scelta dei cavi di segnale da usarsi con la strumentazione soggetta a marchio CE.

Qualità dei cavi di segnale e dei relativi connettori:

Brooks fornisce cavi di elevata qualità che soddisfano le specifiche richieste dalla certificazione CE. Se l'utente intende usare propri cavi, questi devono possedere una schermatura del 100%.

I connettori sia di tipo "D" che circolari devono possedere un guscio metallico. Se esiste un passacavo esso deve essere metallico e fornito di fissaggio per lo schermo del cavo.

Lo schermo del cavo deve essere collegato al guscio metallico in modo da schermarlo a 360° e questo vale per entrambe le estemità.

Lo schermo deve essere collegato ad un terminale di terra.

I connettori "Card Edge" sono normalmente non metallici. Il cavo impiegato deve comunque avere una schermatura del 100% per soddisfare la certificazione CE.

Lo schermo deve essere collegato ad un terminale di terra.

Per il corretto cablaggio dei terminali occorre fare riferimento agli schemi del manuale di istruzioni dello strumento.

Nederlands

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Onderwerp : Addendum voor Instructie Handboek
Referentie : CE certificering voor Mass Flow Meters & Controllers
Datum : Januari 1996

Dames en heren,

Alle CE gemarkeerde elektrische en elektronische produkten van Brooks Instrument zijn met succes getest en voldoen aan de wetgeving voor Electro Magnetische Compatibiliteit (EMC wetgeving volgens 89/336/EEC).

Speciale aandacht is echter vereist wanneer de signaalkabel gekozen wordt voor gebruik met CE gemarkeerde produkten.

Kwaliteit van de signaalkabel en kabelaansluitingen:

- Brooks levert standaard kabels met een hoge kwaliteit, welke voldoen aan de specificaties voor CE certificering.

  Indien men voorziet in een eigen signaalkabel, moet er gebruik gemaakt worden van een kabel die volledig is afgeschermd met een bedekkingsgraad van 100%.
- "D" of "ronde" kabelconnectoren moeten afgeschermd zijn met een metalen connector kap. Indien kabelwartels worden toegepast, moeten metalen kabelwartels worden gebruikt die het mogelijk maken het kabelscherm in te klemmen

  Het kabelscherm moet aan beide zijden over 360° met de metalen connectorkap, of wartel verbonden worden.

  Het scherm moet worden verbonden met aarde.
- "Card-edge" connectors zijn standaard niet-metallisch. De gebruikte kabels moeten volledig afgeschermd zijn met een bedekkingsgraad van 100% om te voldoen aan de CE certificering.

  Het scherm moet worden verbonden met aarde.

Voor pin-configuraties a.u.b. verwijzen wij naar het bijgesloten instruktie handboek.

Hoogachtend,

Norsk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Vedrørende : Vedlegg til håndbok
Referanse : CE sertifisering av utstyr for massestrømsmåling og regulering
Dato : Januar 1996

Til den det angår

Brooks Instrument elektrisk og elektronisk utstyr påført CE-merket har gjennomgått og bestått prøver som beskrevet i EMC forskrift om elektromagnetisk immunitet, direktiv 89/336/EEC.

For å opprettholde denne klassifisering er det av stor viktighet at riktig kabel velges for tilkobling av det måletekniske utstyret.

UTFØRELSE AV SIGNALKABEL OG TILHØRENDE PLUGGER:

- Brooks Instrument tilbyr levert med utstyret egnet kabel som møter de krav som stilles til CE-sertifisering.
- Dersom kunden selv velger kabel, må kabel med fullstendig, 100% skjerming av lederene benyttes.

"D" type og runde plugger og forbindelser må være utført med kappe i metall og kabelnipler må være utført i metall for jordet innfesting av skjermen. Skjermen i kabelen må tilknyttes metallet i pluggen eller nippelen i begge ender over 360°, tilkoblet elektrisk jord.

- Kort-kantkontakter er normalt utført i kunststoff. De tilhørende flatkabler må være utført med fullstendig, 100% skjerming som kobles til elektrisk jord på riktig pinne i pluggen, for å møte CE sertifiseringskrav.

For tilkobling av medleverte plugger, vennligst se håndboken som hører til utstyret.

Vennlig hilsen

Português

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Assunto : Adenda ao Manual de Instruções
Referência : Certificação CE do Equipamento de Fluxo de Massa
Data : Janeiro de 1996.

O equipamento (eléctrico/electrónico) Brooks com a marca CE foi testado com êxito nos termos do regulamento da Compatibilidade Electromagnética (directiva CEM 89/336/EEC).

Todavia, ao seleccionar-se o cabo de sinal a utilizar com equipamento contendo a marca CE, será necessário ter uma atenção especial.

Qualidade do cabo de sinal, buchas de cabo e conectores:

A Brooks fornece cabo(s) de qualidade superior que cumprem os requesitos da certificação CE.

Se fornecerem o vosso próprio cabo de sinal, devem utilizar um cabo que, na sua totalidade, seja isolado com uma blindagem de 100%.

Os conectores tipo "D" ou "Circulares" devem ser blindados com uma blindagem metálica. Se tal for necessário, deve utilizar-se buchas metálicas de cabo para o isolamento do aperto do cabo.

O isolamento do cabo deve ser ligado à blindagem ou bucha metálica em ambas as extremidades em 360º.

A blindagem deve terminar com a ligação à massa.

Os conectores "Card Edge" não são, em geral, metálicos e os cabos utilizados devem ter um isolamento com blindagem a 100% nos termos da Certificação CE..

A blindagem deve terminar com ligação à massa.

Relativamente à configuração da cavilha, queiram consultar o Manual de Instruções.

Suomi
Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Asia : Lisäys Käyttöohjeisiin
Viite : Massamäärämittareiden CE sertifiointi
Päivämäärä : Tammikuu 1996

Brooksin CE merkillä varustetut sähköiset laitteet ovat läpäissyt EMC testit (direktiivi 89/336/EEC).

Erityistä huomiota on kuitenkin kiinnitettävä signaalikaapelin valintaan.

Signaalikaapelin, kaapelin läpiviennin ja liittimen laatu

Brooks toimittaa korkealaatuisia kaapeleita, jotka täyttävät CE sertifikaatin vaatimukset. Hankkiessaan signaalikaapelin itse, olisi hankittava 100%:sti suojattu kaapeli.

“D” tai “Circular” tyyppisen liitimen tulisi olla varustettu metallisuojalla. Mikälì mahdollista, tulisi käyttää metallisia kaapeliliittimiä kiinnitettäessä suojaa.

Kaapelin suoja tulisi olla liitetty metallisuojaan tai liittimeen molemmissa päissä 360°:n matkalta.

Suojan tulisi olla maadoitettu.

“Card Edge Connector”it ovat standarditoimituksina ei-metallisia. Kaapeleiden täytyy olla 100%: sesti suojattuja jotta ne olisivat CE sertifikaatin mukaisia.

Suoja on oltava maadoitettu.

Nastojen liittäminen; katso liitteenä oleva manuaali.

Ystävällisin terveisin,

Svensk
Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : Addendum to the Instruction Manual
Reference : CE certification of Mass Flow Equipment
Date : January 1996

Brooks (elektriska / elektronik) utrustning, som är CE-märkt, har testats och godkänts enligt gällande regler för elektromagnetisk kompabilitet (EMC direktiv 89/336/EEC).

Speciell hänsyn måste emellertid tas vid val av signalkabel som ska användas tillsammans med CE-märkt utrustning.

Kvalitet på signalkabel och anslutningskontakter:

Brooks levererar som standard, kablar av hög kvalitet som motsvarar de krav som ställs för CE-godkännande.

Om man använder en annan signalkabel ska kabeln i sin helhet vara skärmad till 100%.
“D” eller “runda” typer av anslutningskontakter ska vara skärmade. Kabelgenomföringar ska vara av metall alternativt med metalliserad skärmning.

Kabelns skärm ska, i bada ändar, vara ansluten till kontakternas metallkåpor eller genomföringar med 360 graders skärmning.

Skärmen ska avslutas med en jordförbindelse.

Kortkontakter är som standard ej metalliserade, kablar som används måste vara 100% skarmade för att överensstämma med CE-certifieringen.

Skärmen ska avslutas med en jordförbindelse.

För elektrisk anslutning till kontaktstiften hänvisas till medföljande instruktionsmanual.

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Models MT 3809 and 3819

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HELP DESK

In case you need technical assistance:

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Europe	☎ +(31) 318 549 290	Within Netherlands ☎ 0318 549 290
Asia	☎ +011-81-3-5633-7100	

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

Brooks Instrument
407 West Vine Street
P.O. Box 903
Hatfield, PA 19440-0903 USA
T (215) 362-3700
F (215) 362-3745
E-Mail BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, Netherlands
T 31-318-549-300
F 31-318-549-309
E-Mail BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
T 011-81-3-5633-7100
F 011-81-3-5633-7101
E-Mail BrooksAs@BrooksInstrument.com

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